Missouri EPIDEMIOLOGIST

Volume XI, Number 1 *March-April 1989*

Ticks in Missouri

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The days are longer, temperatures are pleasant, spring flowers entice one to journey along remote paths, and from the park you hear "Play ball." But at day's end, you may have an eight-legged creature on your body and you may experience PAIN - FEAR - HYSTERIA. Visions of skin lesions, arthritis, heart palpitation and numbness fill your mind. Could your future entail Borreliosis - Lyme Disease, Ehrlichiosis, Rocky Mountain Spotted Fever, Tularemia or some other fever of undetermined origin? This issue will review tick-borne diseases most likely to occur in Missouri.

TICK FACTS

- Ticks are blood-sucking arachnids capable of transmitting serious and sometimes fatal illness.
- Late spring and summer are peak times for exposure to ticks.
- Ninety-four percent of cases of tick-transmitted diseases occur between April 1 and September 30.
- Most tick bites resolve uneventfully.
- Victims are seldom aware of crawling ticks or even the process of attachment.
- Ticks transfer infection only after they have fed for several hours and are engorged.

PERSONAL PREVENTION

- ✔ Avoid known tick-infested areas.
- ✔ Apply repellents such as diethyltoluamide (Deet) and dimethylphthalate to clothing and exposed parts of the body. (These repellents are active ingredients in many popular insect repellents. Read ingredient labels.)
- ✔ Wear clothing that interferes with tick attachment (boots, full length and one piece outer garments.)
- ✔ Avoid sitting on grass and logs where exposure to ticks increases.
- ✔ Every four-six hours, inspect entire body, including hairy parts, to detect and remove attached ticks.

TICK REMOVAL PROCEDURE — It is suggested that the mechanical removal technique be used for all tick removal.

- ✔ It is important to remove a tick from the host as soon as possible after it is discovered.
- ✔ Proper tick removal is as important in reducing the chance of infections as timely removal.
- ✔ Exercise the same precautions when removing ticks from animals as when removing ticks from humans.

REMOVAL STEPS

1. Disinfect the site prior to tick removal.
2. Grasp the tick close to the skin using blunt, curved forceps or tweezers. If fingers are used, shield them with tissue, paper towels or rubber gloves.
3. Pull upward with steady, even pressure. DO NOT twist or jerk as this may cause mouthparts to break off in the skin.
4. Take care not to squeeze, crush, or puncture the body of the tick as its fluids may contain infective agents.
5. After removing the tick, thoroughly disinfect the bite site and wash hands with soap and water.
6. Safely dispose of the tick by placing it in a container of alcohol or flushing it down the toilet.
7. DO NOT handle ticks with bare hands as infectious agents may enter via mucous membranes or breaks in the skin.

ENVIRONMENTAL PREVENTION

- Keep weeds and grass cut in yards and recreational areas.
- Clear brush along paths.
- Remove ticks from dogs to minimize the tick population near residences. ■

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Tularemia

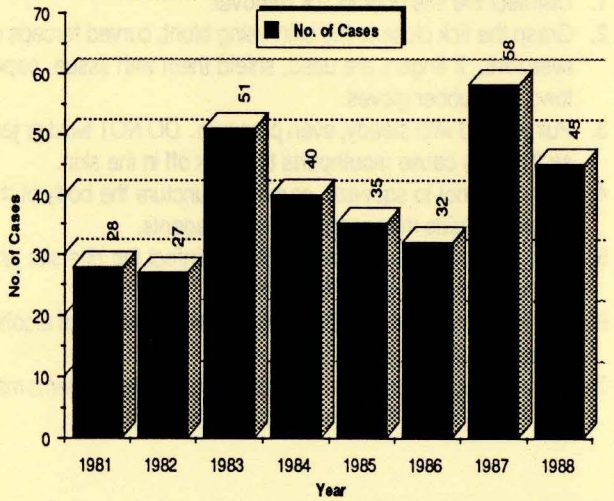
Introduction

Tularemia is a disease of man and animals caused by the bacteria *Francisella tularensis*. Other disease names are rabbit fever and deerfly fever. Tularemia is enzootic in animals throughout the continental United States and in most areas of the world between 30 degrees to 71 degrees North latitude. Missouri lies in one of the two recognized (tularemia) regions in the North American continent, based on biogeographic epidemiology. This region, titled the Ozark Plateau, encompasses portions of Missouri, Arkansas, Oklahoma and Kansas.

Epidemiology

Since 1981, Missouri has incurred 265 cases of Tularemia, or approximately an average of 40 cases per year (See Figure 1.) The number of reported cases has been increasing with 51 cases, 58 cases and 45 cases occurring in 1983, 1987 and 1988 respectfully. Missouri led the nation in total number of cases for those years. In 1981, 1984, 1985 and 1986 Missouri ranked number two, behind either Arkansas or Oklahoma.

Figure 1
TULAREMIA CASES MISSOURI 1981-1988

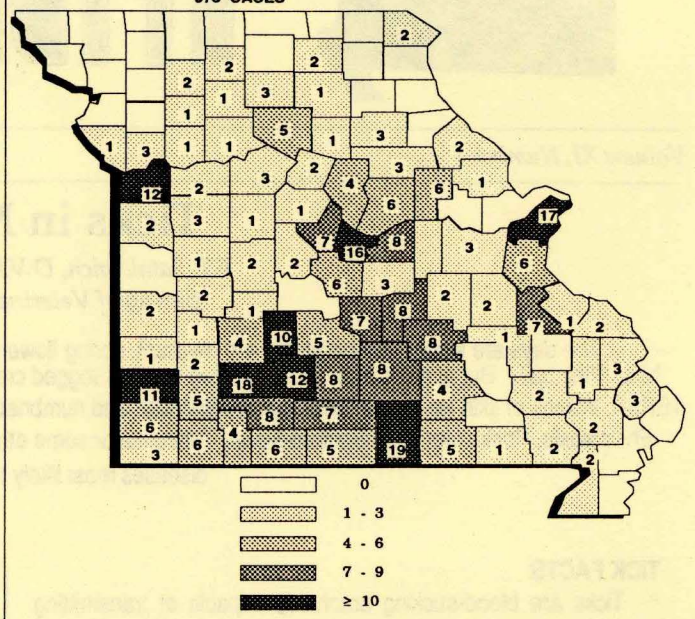


Most cases occur south of the Missouri River. Figure 2 demonstrates the distribution of cases for the last ten years. The percent of people contracting the disease from exposure to ticks or rabbits is about equal. The disease occurs more in males, probably due to exposure, than females.

Reservoirs and Transmission

Ticks not only are the most important vectors of tularemia, but they also serve as reservoirs for the organism, which is transmitted transovarially. Seven tick varieties are known to transmit tularemia, either animal to man or animal to animal. Three of these varieties are found in Missouri, however, only one variety - *Amblyomma americanum* (Lone Star tick) - is considered important as a direct transmitter of tularemia to man. This tick is found primarily south of the Missouri River and more specifically is concentrated in the Ozark

Figure 2
TULAREMIA 1978 - 1988
378 CASES



region as evidenced in Figure 2. All stages of this tick —larva, nymph and adult— readily feed on humans as well as livestock, dogs, deer and birds.

Dermacentor variabilis (American dog tick) and *Haemaphysalis leporispalustrus* (rabbit tick) are other ticks found in Missouri which transmit tularemia in animals. The American dog tick prefers dogs; however, it readily feeds on other mammals but is not considered a threat to humans. The rabbit tick prefers to feed on birds during its nymphal stage while the adult tick prefers rabbits, dogs, cats or horses as hosts.

Rodents and rabbits are the most susceptible animal species for tularemia and present an important source of infection for man. The disease also has been reported in sheep, goats, swine, cattle and horses. The infection is transmitted by insects (ticks, deerflies, fleas) as well as by water and contaminated feed. Dogs and cats are susceptible and have been known to contract the disease by eating raw meat of sick, wild rabbits. The disease can then be transmitted to man through bites or scratches. In addition, transmission via laboratory infections have also been reported.

Although the domestic rabbit is susceptible to experimental tularemia, rabbits raised in rabbitries and confinement in the United States have very rarely been found infected; therefore, they may be handled and eaten safely.

"White spotty" livers in wild rabbits as game may cause concern. Although white spots in the liver may be indicative of tularemia, it is not the only cause of such lesions. It should be stressed that once the carcass has been opened using bare hands, human exposure has occurred. Protective gloves should be worn while skinning and dressing wild game.

ILLNESS IN MAN—

The *Francisella tularenisis* organism, a small gram negative bacterium, is extremely virulent in man. Onset of the disease is sudden with the incubation period being 2-5 days normally, with a range from 1-10 days.

Patients with a history of recent tick or deerfly bite, dressing wild game animals, or being in outdoor areas in summer months who present themselves with fever, headache, malaise, prostration, ulcerated lesions, or swollen lymph nodes are prime candidates for tularemia, and it should be included in the differential diagnosis. Since insect bites are often unnoticed and the disease may be contracted by drinking contaminated water, inhaling infected dust, or eating undercooked meat, tularemia should not be ruled out based on history alone.

Six forms of the disease are now described: ulceroglandular, glandular, oculoglandular, oropharyngeal, typhoidal, and pneumonic. The clinical forms of disease are determined by the portal of entry of the organism.

Three Most Common Forms of Tularemia

The **ulceroglandular** form is the most common clinical form and accounts for 85 percent of the human cases reported in the U.S. A local lesion occurs at the portal of entry (insect bite, scratch by contaminated nails or knife cut) and later develops into a necrotic ulcer accompanied by swelling of the regional lymph nodes. The lymph nodes frequently ulcerate and drain.

The **oculoglandular** form develops when contaminated material reaches the eye. The primary lesion is localized in the lower eyelid and consists of an ulcerated papule with simultaneous swelling of the regional lymph node.

The **typhoidal** form is believed to be caused by consuming contaminated foods, usually the meat of infected wild rabbits, or contaminated water. Symptoms include gastroenteritis, fever and toxemia. Ulcerative lesions in the mucosa of the mouth, pharynx, and intestines sometimes acompanied by swelling of the cervical, pharyngeal and mesenteric lymph glands also appear. If not treated promptly the course of this clinical form may be short and fatal.

It is estimated that 30 percent of all tularemia patients develop bronchopneumonia. The case fatality rate in the U.S. is less than one percent in treated cases and five percent in untreated cases.

The Missouri Department of Health Public Health Laboratory **no longer** conducts agglutination tests specific for *Francisella tularensis*. Ideally, acute and convalescent sera should be tested to demonstrate a fourfold rise in titer which is diagnostic. Titers usually take 10 to 14 days to develop and reach their peak in four to six weeks. Titers may remain elevated for years. If only convalescent serum is tested, a titer of:160 with compatible symptoms is considered to be diagnostic. Culturing of the organisms is difficult because of its fastidious growth habits. It is usually cultured in a cystine agar. Recently it was found that a number of agars contained cystine, thus promoting growth of the *Francisella tularensis* organism while culturing for other organisms. This scenario caused the exposure of a number of laboratory workers not practicing microbiological safety requirements.

Treatment

Streptomycin sulfate remains the drug of choice; 0.5 intramuscularly (IM) every 12 hours for 10 days will eradicate organisms. With streptomycin therapy, there is usually marked clinical improvement in 48 to 72 hours. Kanamycin sulfate (15mg/kg/day IM) or gentamicin (3.0 mg/kg/day IM) are also effective. Tetracycline hydrochloride and chloramphenical are effective in controlling the acute symptoms; however, unless treatment consists of 2.0g daily for 15 days, relapses are common.

Control/Prevention

Man is primarily infected from handling, skinning and cleaning infected wildlife; from eating undercooked infected meat and drinking contaminated water; and through insect bites. Critical at-risk groups include trappers, fur dealers, those working in fur-processing plants, and hunters and their families. These simple precautions should be followed:

1. Avoid handling a wild rabbit that is too sick to run or that is caught by a dog.
2. Wear rubber gloves or thoroughly disinfect hands during or after dressing or skinning rabbits or aquatic fur animals.
3. Thoroughly cook wild game meat. The causative agent is destroyed within 10 minutes at 140° Fahrenheit.
4. Avoid drinking untreated water.
5. Avoid bites of flies, mosquitoes and ticks through the use of insect repellents and protective clothing when working in endemic areas. ■

Borrelliosis — Lyme Disease

A tick-borne spirochetal disease caused by *Borrelia burgdorferi* the spirochette. It is transmitted to man by the Ixodes tick, (*Ixodes dammini* in northern and northeastern US; *Ixodes pacifus* on the west coast) from wild rodents, deer and other animals.

Ninety percent of the cases have occurred in eight states: Connecticut, Massachusetts, New Jersey, New York, Rhode Island, Minnesota, Wisconsin and California.

The diagnosis of Lyme Disease is difficult. The characteristic skin lesion erythema chronicum migrans (ECM) is not always that characteristic. and may many times be confused by entities such as infected tick bites, summer exemas, or contact dermatitis from plants or pesticides. Often the physician does not see the lesion but is told by the patient that it looked just like the picture in the magazine.

The maladies of malaise, fatigue, fever, headache, stiff neck, myalgia, althralgia or lymphadenopathy are not only characteristic for all richettsial diseases, but also many other tick-borne, mosquito-borne illnesses and febrile illnesses of undetermined origin.

The arthritis that develops could be due to other causes; therefore other causes should be ruled out before attributing the illness to the *Borellia burgdorferi* spirochette. Neurological signs and symptoms can be caused by a multitude of illnesses and the cardiac signs are transitory and infrequent.

Public health authorities use the following case definition:

Definite Case

1. Tick bite with engorgement
2. Auxiliary clinical illness
3. ECM diagnosed by a physician
4. Positive serology IFA=256, ELISA=160, Opt. Density =≥0.2
5. Involvement of at least two of the three organ systems.

OR

1. Isolation of *B. burgdorferi* from a clinical specimen.

Probable Case

1. Tick bite with engorgement
2. Auxiliary clinical illness
3. ECM diagnosed by a physician
4. No serology
5. With involvement of two of the three organ systems

OR

1. Tick bite with engorgement
2. Auxiliary clinical illness
3. Absence of ECM
4. A positive serologic test
5. Involvement of two of the three organ systems

Possible Case

1. Any combination of above criteria, that cannot be ruled out as a negative case.

Laboratory testing is not conducted at CDC nor the Missouri State Public Health Laboratory. Laboratory methods are not standardized between laboratories and of limited value in a non-endemic area, where other spirochettes, both pathogenic and non-pathogenic could cross react giving false positive results. Culturing of the spirochettes in human patients, is most difficult.

Laboratory Diagnosis:

1. Clinical criteria.
2. Demonstration of - IFA titer of 256 or higher

   Elisa Titer 160 (Optical Density ≥0.2)

The physician is forced to make an early presumptive diagnosis, much the same as in RMSF, and begin early antibiotic therapy. The antibiotic of choice is tetracycline at the dose 25-50 mg/kg/day for 10 days. The physician should make the presumptive diagnosis and report it to their local health department or the Missouri Department of Health for verification.

The ultimate proof of whether the *Borrelia burgdorferi* spirochette is present in Missouri will lie with the field epidemiologists, microbiologists, entomologists and animal biologists. At the present time, the University of Missouri *Borrelia burgdorferi* Task Force, composed of these specialists plus physicians specializing in infectious disease and veterinarians, is not certain of the status of Lyme Disease in Missouri.

The Missouri Department of Health has orchestrated a research effort involving the aforementioned specialists from the University of Missouri-Columbia, College of Veterinary Medicine and School of Forestry, Fisheries and Wildlife; Missouri Department of Conservation; and the United States Army to conduct a series of isolation studies in ticks and rodents to demonstrate the presence of the *Borrelia burgdorferi* spirochette in Missouri. Current data indicate that neither the *Ixodes dammini* nor *pacifus* inhabit Missouri. A distant cousin, *Ixodes scapularis* does inhabit the area south of the Missouri River. However, the life cycle of this tick incorporates reptiles rather than the suggested rodent reservoir. If Lyme Disease is present in Missouri, it may be using a different cycle or vector from that described elsewhere; however, it is not the problem seen in the Northern and Eastern U.S The results of these activities should be available by the fall of 1989.

The prevention and control of all tick-borne diseases is the same. Thus, the procedures the Department of Health recommends for Tularemia and RMSF also protect us from Ehrlichiosis and Lyme Disease.

All suspected tick-borne diseases should be thoroughly investigated. Please notify your local health department or call the **Bureau of Veterinary Public Health at 314/751-6136 to obtain assistance.** ■

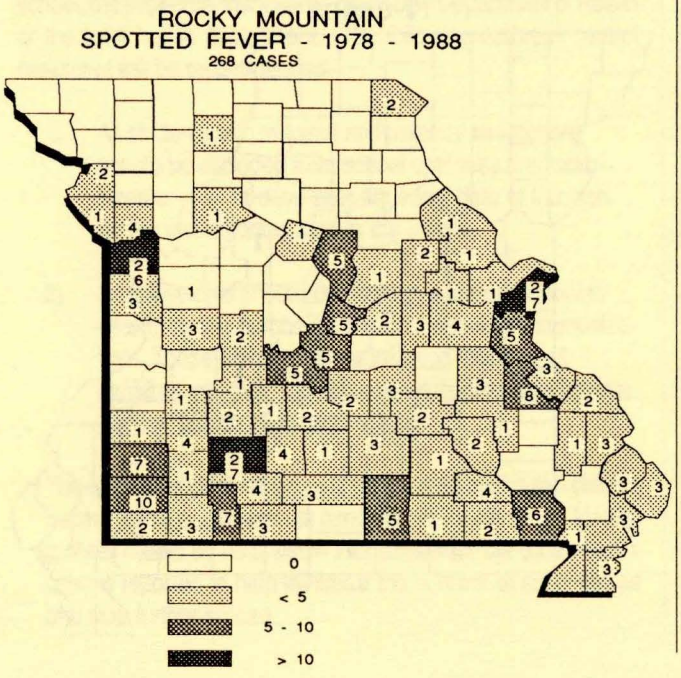
Rocky Mountain Spotted Fever

Rocky Mountain Spotted Fever (RMSF) is characterized by sudden onset of symptoms including headache, conjunctivitis, peripheral and periorbital edema, chills, fever lasting two to three weeks, myalgia, and a maculopapular rash usually appearing on the second to sixth day. The rash is the most characteristic and helpful diagnostic sign. It usually appears first on the wrists and ankles and may include the palms and soles, spreading centripetally to the rest of the body. If treatment is delayed, petechiae and purpuric skin lesions are common. Health professionals are encouraged to investigate the possibility of tick exposure when diagnosing illnesses in patients presenting with these symptoms.

The infectious agent of RMSF is *Rickettsia rickettsii.* Even though dogs, rodents, and other small animals may harbor the rickettsiae, the principal vector and reservoir is the tick. Ticks become infected by feeding on infected mammals (rodents, dogs, and possibly other domestic animals) and harbor the rickettsia for life (about 18 months). Infected female ticks can transmit the disease transovarially to their offspring. Thus, animal reservoirs, while they may play a role in the maintenance of the disease cycle, are not necessary for the maintenance of the rickettsial organisms in nature. RMSF is best confirmed by a fourfold rise in titer of antibody to the spotted fever group antigen by indirect fluorescent antibody (IFA), complement fixation (CF), microagglutination (MA), indirect hemagglutination (IHA), or the latex agglutination (LA); a single convalescent titer of 64 or higher (IFA) in a clinically compatible case; by isolation of spotted fever group rickettsiae; or by fluorescent antibody staining of biopsy or autopsy specimens. The Weil-Felix (also known as Proteus OX-19, OX-2, WF) test, which is **not specific** for RMSF, will give false positive elevation with non-rickettsial infections and should not be used as a diagnostic test.

Treatment

The confirmation of RMSF is of epidemiologic importance and usually cannot be expected to occur before 10-14 days after onset of illness; therefore, diagnosis must rely on clinical (fever, headache, rash, myalgia) and epidemiologic (tick exposure) criteria, and treatment must be initiated before laboratory confirmation is available. The drugs of choice are tetracycline (25-50 mg/kg/day), and chloramphenicol (50 mg/kg/day) orally in 4 divided doses for 7-10 days.

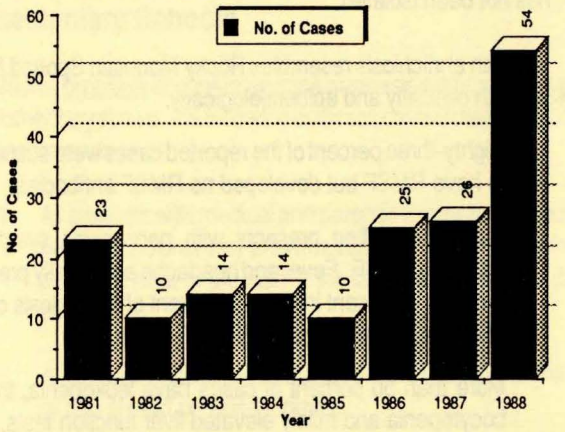


Epidemiology

Ninety percent of the thousand rickettsial diseases that occur annually in the US are RMSF. During the 1980's, approximately 50 deaths per year were attributed to RMSF. The total number of cases, nationally, has increased since the 1960's and peaked in 1981. While the national incidence, and especially the incidence in southeastern states plateaued or decreased, the incidence of RMSF in Arkansas, Oklahoma and Texas increased between 1981-1983 by 107 percent. This was followed by a 50 percent decrease in those states in 1984-1985. The majority of cases (83 percent) in those states occurred between April and August and 67 percent of cases were in males. The case fatality ratio was 4.7 percent with rates being higher in blacks and elderly. The endemic foci of RMSF that exists in Arkansas, Oklahoma and Texas has an annual incidence trend that differs from the rest of the nation.

Missouri does not totally follow either trend (see Figure 1). From 1982-1985, Missouri averaged 12 cases per year. The four years prior, 1978-1981, Missouri averaged 28.5 cases per year. The number of cases from 1986-1988 has increased yearly with 25, 26 and 54 cases occurring in those respective years (see Figure 2).This increase cannot be explained other than better diagnostic procedures and surveillance. Missouri had one death from Rocky Mountain Spotted Fever in 1988.

Figure 2
ROCKY MOUNTAIN SPOTTED FEVER MISSOURI 1981-1988

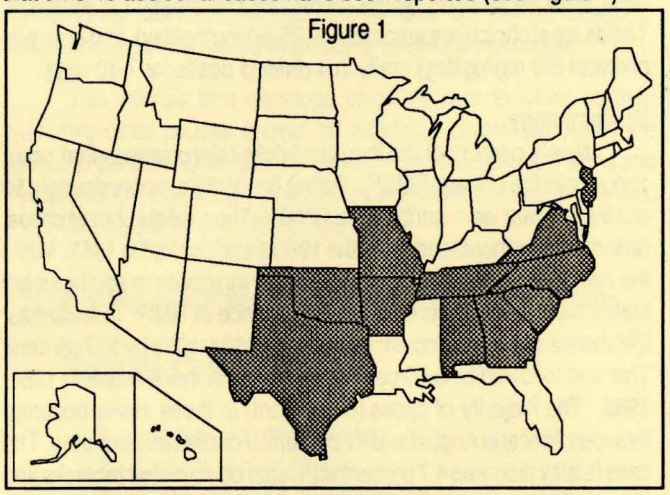


During1981-1983, there were 3,294 cases of RMSF reported to the Centers for Disease Control. Of that number, 87 percent were followed up with a case investigation report. The number of final cases that met the RMSF case definition was 1,375 or 41.7 percent of the number initially reported. While this disparity may be confusing or discouraging to the reporting physician, it should be kept in mind that without the physician's early diagnosis and treatment, based on only minimal clinical evidence, the patient's disease would, most likely, have advanced to a truely confirmed case of RMSF, perhaps resulting in a fatality. This fact should be remembered in the diagnosis and treatment of all tick-borne diseases. ■

Ehrlichiosis

Human ehrlichiosis infections have been recognized in the U.S. since 1986 when a case was identified in an Arkansas resident. Since that time 45 additional cases have been reported (see Figure 1).

Figure 1



Distribution of 46 human ehrlichiosis cases in the United States, January 1986 - May 1988, by state of tick exposure or state of residence. Adapted from *MMWR* 1988:37:270, 275-277.

Seventy-four percent of patients were male, and the majority of patients were between 30 and 60 years of age (age range = 2-68). Patients were exposed to infection in 11 states, the majority of which are in the southeastern and south-central areas of the country. Onsets of illness occurred between March and October.

Previously, human cases (caused by *Ehrlichia canis* or a closely related organism) had been diagnosed in Japan and Malaysia. *E. canis* is a well-established cause of animal disease, particularly in dogs. The causative agent of human ehrlichiosis in the U.S. has not been isolated.

Human ehrlichiosis resembles Rocky Mountain Spotted Fever (RMSF) both clinically and epidemiologically.

- Eighty-three percent of the reported cases were suspected to have RMSF but developed no RMSF antibodies.
- Ehrlichiosis often presents with nonspecific symptoms similar to RMSF. Fever and headache are usually present, but rash is present in only 20 percent of ehrlichiosis cases compared to 88 percent of RMSF cases.
- More than 50 percent of cases have leukopenia, thrombocytopenia and mildly elevated liver function tests, specifically aspartate transaminase and alanine transaminase.
- Most patients have reported tick bites one to three weeks prior to onset of symptoms.
- Treatment of Ehrlichiosis is usually tetracycline, administered in the same dose and schedule as is recommended for RMSF. Additionally, doxycycline and minocycline have been suggested as alternative therapies.

Ehrlichia, members of the family *Rickettsiaceae*, are obligate, intracellular, bacteria that parasitize mononuclear or polymorphonuclear leukocytes. The ability of *Ehrlichia* to infect and cause disease in animals is well-documented. In the US, serological evidence of *E. canis* infection has been reported among dogs in at least 34 states.

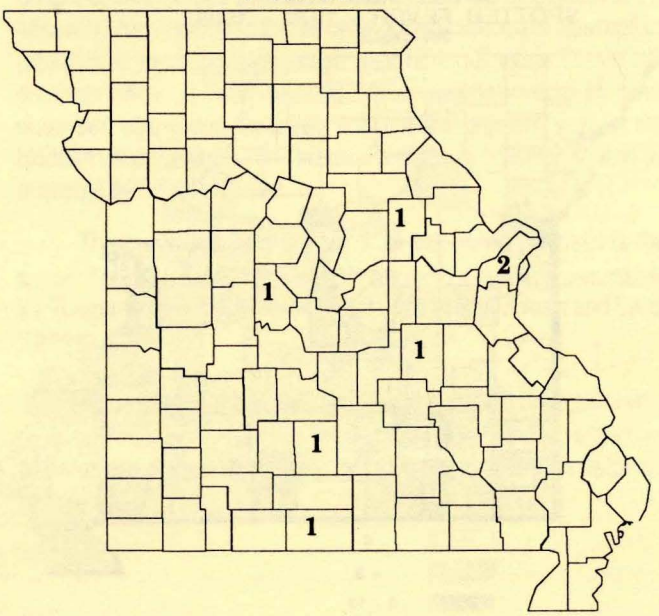
Preliminary data suggest that human ehrlichiosis, like canine ehrlichiosis, is tick-borne. Although canine ehrlichiosis is transmitted by the brown dog tick, *Rhipicephalus sanguineus*, this tick is probably not the main vector or reservoir involved in human transmission since it rarely bites people. Because transovarian transmission does not occur in this tick, wild *Canidae*, rodents and chronically infected dogs should be considered possible reservoirs. There is no evidence that human ehrlichiosis is transmitted directly from dogs to people.

The diagnosis of ehrlichiosis is suggested by signs and symptoms compatible with ehrlichiosis and a history of tick bite. It is confirmed by indirect fluorescent antibody testing for antibodies against *E. canis*. Because the causative agent of human ehrlichiosis has not yet been isolated from a human being, the assay uses *E .canis* antigen isolated from a dog. Diagnosis currently requires ≥ fourfold increase/decrease in antibody titer to *E. canis* in acute- and convalescent-phase serum samples, with a minimal antibody titer of 80.

During 1988, there were seven cases of Ehrlichiosis diagnosed in Missouri (see Figure 2). Sera from patients with suspected RMSF diagnoses who fail to develop specific RMSF antibodies, and from other patients with a documented febrile illness compatible with ehrlichiosis, should be submitted to the Missouri Department of Health, State Public Health Laboratory. The patient's clinical history should accompany the specimens. Paired sera (collected preferably 2-4 weeks apart) will be forwarded to the Centers for Disease Control for testing. CDC will not test single serum specimens. ■

Figure 2

Ehrlichiosis Cases - 1988
7 cases



Missouri Department of Health Measles Outbreak Control Strategies in Public and Private Schools 1989

Steve Weems, Bureau of Immunizations

Changes in outbreak-control strategies for school-based outbreaks were developed because of persistence of measles spread and high level of measles virus transmissibility which tends to overwhelm herd immunity. The following is reprinted from *Morbidity and Mortality Weekly Report*, January 13, 1989/Vol. 38/No. 1, Pages 11-14 and addresses the ACIP recommendations for measles outbreaks.

"Because of the prominent role that persons with primary vaccine failure are playing in measles transmission, the Immunization Advisory Practices Committee of the Centers for Disease Control (ACIP) recommends the institution of some form of revaccination in outbreaks that occur in junior or senior high schools, colleges, universities, or other secondary institutions. In an outbreak, the ACIP recommends that, in affected schools as well as unaffected schools at risk of measles transmission from students in affected schools, all students and their siblings who received their most recent dose of measles vaccine before 1980 should be revaccinated. This date was selected for several reasons: 1) this strategy will capture almost all students vaccinated between 12 and 14 months of age, a group known to be at increased risk of primary vaccine failure, since the recommended age for routine vaccination was changed from 12 to 15 months in 1976; 2) it may be easier to identify students by year of vaccination than by age at vaccination; and 3) in some outbreak investigations students vaccinated before 1980 have been found to be at increased risk for measles. This is not felt to be due to waning immunity but rather to a higher rate of primary vaccine failure in persons vaccinated before that time. This higher rate may be due to different reasons, including less than optimal vaccine storage and handling or to the greater lability of the measles vaccine manufactured before a new stabilizer was used 1979. While the exact date had not been determined, 1980 is a conservative cutoff. If all students vaccinated before 1980 cannot be revaccinated, then persons vaccinated before 15 months of age should be targeted."

In response to this federal guidance the state of Missouri's Bureau of Immunization has developed the following strategies:

Junior and Senior High Schools

When a probable or confirmed case of measles is reported in the school, the superintendent will be notified by Department of Health or the local health department. The following outbreak control measures will be recommended:

1) All students with medical and parental exemptions should be excluded from school until they are immunized or until 14 days after the onset date of the rash for the last reported case in the school.

2) Arrangements should be made to audit the school to determine the number of students needing reimmunization. Those needing reimmunization includes all students and their siblings who were immunized before 1980 or before 15 months of age.

The superintendent will be notified if a reimmunization clinic is necessary so arrangements can be made in advance. Ideally, a clinic should be held within four days after the date when a case is reported to help minimize the number of susceptibles and stop further spread.

Elementary Schools

When a probable or confirmed case of measles is reported in an elementary school, the following outbreak control measures are recommended:

1) All students with medical and parental exemptions should be excluded until they are immunized or until 14 days after the onset date of the rash in the last case reported in the school.

2) All students who were immunized earlier than 12 months of age should be reimmunized.

An audit to determine the number of students who were immunized earlier than 1980 or before 15 months of age is usually not necessary in elementary schools. It is also rarely necessary to hold immunization clinics in elementary schools.

The Centers for Disease Control (CDC) measles elimination strategy targets junior and senior high school and college students as high risk groups in measles transmission. The

majority of students attending elementary schools were immunized after 1980 and have not played a significant role in measles transmission.

Please note that these recommendations apply only in the event of a local measles outbreak. Otherwise, the schedule for routine immunization remains unchanged. There is no need to reimmunize children or teens if they do not fall within the current target groups in outbreak control situations.

If you have questions or need more information please contact the local health department nearest you or the Missouri Department of Health, Bureau of Immunization, P.O. Box 570, Jefferson City, Missouri 65101 (314) 751-6133. ■

Electronic Routing Service for MMWR Inquiries

404/ 332-4555 is the number to call for the Centers for Disease Control's Electronic Routing Service for inquiries concerning the *Morbidity and Mortality Weekly Report* Series of Publications. This new telephone feature will allow staff to respond more efficiently to inquiries relating to *MMWR* including questions about types and sources of subscriptions, requests for information about published material and questions regarding submitting and scheduling material for publication. Although the routing service is electronic, a caller may elect at any point to request that a staff member come on the line to assist him/her.

Missouri EPIDEMIOLOGIST

Published by the
Missouri Department of Health
Division of Environmental Health
and Epidemiology Services
P.O. Box 570, 1730 E. Elm Street
Jefferson City, MO 65102-0570
Telephone: (314) 751-6080
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Measles Epidemic 1988-89

Ken Laliberte, Chief, Bureau of Immunizations

Introduction

The largest measles outbreak in Missouri in recent years began in the Kansas City metropolitan area in mid-December, 1988. Cedar County also experienced confirmed measles cases which were epidemiologically-linked to the Kansas City outbreak. During the latter part of January 1989, St. Louis County and Jasper County became involved. The following will summarize measles activities in those areas from the first reported measles case through April 12, 1989.

Kansas City Metro Area

The outbreak began in Blue Springs, a suburb just to the east of Kansas City in Jackson County. The initial case occurred at Blue Springs High School in mid-December; measles then spread very rapidly throughout the school district. By December 17, revaccination clinics were held in Blue Springs schools based on advice from the Centers for Disease Control (CDC) which was subsequently published as the ACIP Measles Prevention: Supplemental Statement, Morbidity and Mortality Weekly Report, January 13, 1989/Vol. 38 /No. 1, pages 11-14 and found reprinted in this issue on page 7.

The Department of Health (DOH) received 362 rash illness reports from the Kansas City Metro area; 44 were laboratory confirmed as measles; 87 reports were confirmed through epidemiological link; 85 reports are considered probable cases; 47 remain under investigation; and 99 reports have been dismissed as not being cases of measles.

The school nurse at El Dorado Springs High School in Cedar County reported a 14-year-old student absent because of a rash illness. Investigation revealed the patient's rash onset was December 25, 1988 and no documented history of measles immunization. The student had attended a speech debate at Raytown South High School seven days prior to rash onset. The debate included a team from Blue Springs High School. Household contacts included six siblings and two parents, one of whom had documented history of measles immunization. All siblings became infected and diagnosed as measles either by laboratory or epidemiological link. No additional spread of measles cases where reported in this school.

By March 13, 1989, county health officials from Jackson, Clay, and Cass county along with the Kansas City Health Department and DOH held revaccination clinics at 49 elementary, junior and senior high schools throughout the greater Kansas City Metro Area. Approximately 24,587 doses of MMR vaccine were administered.

Additional measles cases were reported April 7 in Jackson County. Epidemiologic investigation continues of all rash illnesses reported. Surveillance remains intensive for this area.

St. Louis County Area

During the latter part of January, the St. Louis Department of Community Health and Medical Care (SLDCH) reported a rash illness indicative of measles in a student at North McCluer High School.

Based on the experience concerning outbreak control measures employed in Kansas City, SLDCH and DOH implemented the sameoutbreak control strategy.

DOH received 201 rash illness reports from St. Louis County, 23 of which were laboratory confirmed for measles; two reports were epidemiologically-linked; seven reports are considered probable cases; fifty-nine cases remain under investigation and 110 reports have been dismissed as not being cases of measles.

The St. Louis County Health Department and DOH have held two school based clinics; one at North McCluer High School and one at Hazlewood Junior High where approximately 1,829 doses of MMR or single antigen measles vaccine were administered.

Additional measles cases were reported on April 7, 1989 from St. Louis and St. Charles counties. Surveillance remains very intensive. No cases were reported from the City of St. Louis.

Jasper County/Joplin

DOH received a report of rash illness from the Joplin South Middle School the last week of January which met the case definition for measles. Measles outbreak control measures were employed immediately. Within 48 hours, a school-based clinic was held (January 26, 1989) at Joplin South Middle School where approximately 705 doses of MMR were administered.

DOH received 64 rash illness reports from this area, two of which were laboratory confirmed; fourteen were epidemiologically-linked and the balance were dismissed as not measles. The last reported rash illness occurred February 19, 1989 and analysis indicates that this measles outbreak is over in Jasper County/Joplin.

Statewide Measles Summary follows on reverse page....

Summary

This measles outbreak, which began in early November 1988, involved a total of eight counties in Missouri (Jackson, Clay, Cass, Jasper, Barton, St. Louis, St. Charles and Adair). Sixty-two elementary, junior and senior high schools, representing an enrollment of 46,521 students, were exposed.

By April 10, a total of 340 confirmed or epidemiologicaaly-linked measles cases had been reported from six counties since the outbreak began in November. DOH has so far spent more than $400,000 to provide 26,000 doses of vaccine for 63 elementary and secondary schools. Local health departments have provided most of the staff to administer the vaccine.

Missouri Measles Epidemic
(as of April 10, 1989)

783	Cases of Rash Illness (Since November 1, 1988)
340	Cases Confirmed or Suspected
80	Lab confirmed Measles
15	Met CDC Measles Criteria
198	Confirmed by Epi-Link
47	Still under Investigation
443	Dismissed as Not Measles

Prompt reporting of rash illnesses by private physicians and school officials led to rapid investigation and initiation of control measures. Local health authorities and DOH were able to rapidly establish public health vaccination clinics in schools and vaccinate or revaccinate exposed students. Through this cooperative effort, the further spread of measles was prevented from neighboring communities. ■

Summary of AIDS Cases Reported in Missouri, 1982 to April 8, 1989

	1989 Cases to date	1989 Deaths to date	Total Cases to date	Total Deaths to date	Pending Cases
St. Louis City	25	6	222	136	0
St. Louis County	20	7	119	66	0
Kansas City	22	1	352	151	1
Springfield/Greene Co.	2	1	33	18	3
Federal Prison Medical Center	0	0	12	9	1
Outstate Missouri	26	13	177	108	2
Missouri Total	95	28	915	488	7

MISSOURI DEPARTMENT OF HEALTH
DISEASE PREVENTION — COMMUNICABLE DISEASE CONTROL

BIMONTHLY MORBIDITY REPORT

Reporting Period *
November & December , 19 88

	DISTRICTS							KANSAS CITY	ST. LOUIS CITY	ST. LOUIS CO.	SPGFD *	2 MONTH STATE TOTALS		CUMULATIVE FOR	CUMULATIVE FOR	5 YR MEDIAN
	** NW	NE	CD	SE	** SW	** ED	*** OTHER					1988	1987	1988	1987	
Vaccine Preventable Dis.																
Chickenpox	216	403	307	297	182	524		0	0	0	3	1932	1719	11350	8595	2565
Diphtheria	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Influenza	0	0	2	0	0	0		0	2	2	0	6	4	148	69	69
Measles	61	0	0	0	1	0		1	0	0	0	63	0	65	190	6
Mumps	2	2	25	1	1	1		2	0	0	0	34	10	68	38	21
Pertussis	1	0	0	0	0	1		0	1	0	0	3	14	25	46	32
Polio	0	1	0	0	0	0		0	0	0	0	1	0	1	0	0
Rubella	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Tetanus	0	0	0	0	0	0		0	0	0	0	0	0	1	1	2
Viral Hepatitis																
A	59	1	2	14	10	0		100	4	6	2	198	298	897	560	126
B	15	6	27	13	5	8		35	16	12	6	143	107	639	460	365
Non A - Non B	1	0	0	1	0	1		0	0	3	0	6	10	50	46	39
Unspecified	2	0	0	1	0	0		2	0	0	0	5	2	21	21	24
Meningitis																
Aseptic	6	2	2	1	2	1		11	2	3	0	30	37	124	163	163
H. influenza	6	2	8	4	4	2		9	4	3	1	43	42	138	131	108
Meningococcal	0	0	1	1	1	0		2	1	0	0	6	10	33	35	46
Other	1	1	0	2	1	2		2	0	3	0	12	10	64	75	75
Enteric Infections																
Campylobacter	7	2	9	7	5	5		9	7	12	8	71	52	441	260	260
Salmonella	25	7	13	11	17	14		17	16	14	9	143	96	772	660	660
Shigella	2	0	27	7	5	9		16	12	7	16	101	120	607	471	244
Typhoid Fever	0	0	1	0	0	0		0	0	0	0	1	3	3	7	6
Parasitic Infections																
Amebiasis	0	0	0	0	0	1		0	0	4	0	5	9	30	27	28
Giardiasis	21	7	19	2	9	7		19	5	14	16	119	131	654	690	462
Toxoplasmosis	0	0	0	0	0	0		0	0	0	0	0	8	17	96	*
Sexually Transmitted Dis.																
AIDS	3	1	2	0	2	2		22	16	8	1	57	75	403	239	52
Gonorrhea	128	18	79	125	38	28		1303	1217	419	52	3407	2466	17241	16491	20023
Genital Herpes	40	3	71	30	23	14		97	113	26	7	424	145	2250	1340	*
Nongonoc. urethritis	51	15	32	30	5	20		240	575	305	13	1286	1201	7606	7947	7895
Prim. & sec. syphilis	1	0	0	6	2	0		21	0	2	0	32	9	154	90	133
Tuberculosis																
Extrapulmonary	0	0	2	0	1	1	1	0	1	4	0	10	13	42	57	53
Pulmonary	0	1	6	7	5	3	1	16	6	3	0	48	55	233	282	282
Zoonotic																
Animal Bites	214	29	27	84	36	64		2	40	707	0	1203	208	7274	2406	*
Psittacosis	0	0	1	1	0	0		0	0	0	0	2	0	3	2	1
Rabies (Animal)	0	0	1	2	0	0		0	0	0	0	3	6	36	59	70
Rocky Mtn. Sp. Fever	1	0	1	1	1	0		1	0	0	0	5	12	54	26	14
Tularemia	0	2	1	1	1	0		0	0	0	0	5	20	45	58	40

Low Frequency Diseases

Anthrax
Botulism
Brucellosis- 1
Chancroid
Cholera
Cryptosporidiosis
Encephalitis (infectious) -1
Encephalitis (viral/arbo-viral)
Granuloma Inguinale
Kawasaki Disease -1
Legionnellosis -4
Leptospirosis
Lymphogranuloma Venereum
Malaria
Plague
Rabies (human)
Reye's Syndrome
Toxic-Shock Syndrome- 2
Trichinosis

Outbreaks

Foodborne/waterborne- 2
Histoplasmosis
Nosocomial- 2
Pediculosis
Scabies
Other

* *Reporting Period Beginning* November 1, *Ending* December 31.
** *Totals do not include KC, SLC, SLCo, or Springfield*
*** *State and Federal Institutions*

Due to data editing, totals may change.

MO 580-0490 (7-88)

*includes Springfield/Greene Co

MISSOURI DEPARTMENT OF HEALTH
DISEASE PREVENTION — COMMUNICABLE DISEASE CONTROL

BIMONTHLY MORBIDITY REPORT

Reporting Period * January & February , 1989

	DISTRICTS							KANSAS CITY	ST. LOUIS CITY	ST. LOUIS CO.	SPGFD *	2 MONTH STATE TOTALS		CUMULATIVE FOR	CUMULATIVE FOR	5 YR MEDIAN
	.. NW	NE	CD	SE	.. SW	.. ED	... OTHER					1989	1988	1989	1988	
Vaccine Preventable Dis.																
Chickenpox	323	219	375	515	316	456		0	0	267	1	2472	2346	2472	2346	
Diphtheria	0	0	0	0	0	0		0	0	0	0	0	0	0	0	
Influenza	4	1	42	7	0	10		11	30	24	0	129	37	129	37	
Measles	116	0	0	0	18	0		11	0	52	0	198	0	198	0	
Mumps	1	0	27	0	0	0		0	0	0	0	28	10	28	10	
Pertussis	0	0	1	0	0	0		0	0	0	0	1	2	1	2	
Polio	0	0	0	0	0	0		0	0	0	0	0	0	0	0	
Rubella	1	0	0	0	0	0		0	0	0	0	1	0	1	0	
Tetanus	0	0	0	0	0	0		0	0	0	0	0	0	0	0	
Viral Hepatitis																
A	26	0	3	5	8	2		5	2	2	2	55	105	55	105	
B	5	3	3	5	3	1		0	6	6	4	36	61	36	61	
Non A - Non B	0	0	0	1	1	0		0	0	0	0	2	4	2	4	
Unspecified	1	0	0	0	0	1		0	0	0	0	2	0	2	0	
Meningitis																
Aseptic	0	2	0	1	0	4		2	0	0	1	10	4	10	4	
H. influenza	1	0	1	1	3	1		1	2	0	0	10	14	10	14	
Meningococcal	1	0	0	0	0	0		0	0	0	0	1	8	1	8	
Other	1	0	0	1	1	2		1	0	0	0	6	6	6	6	
Enteric Infections																
Campylobacter	1	1	2	5	4	4		0	3	7	6	33	24	33	24	
Salmonella	2	0	5	3	3	24		5	16	15	1	74	69	74	69	
Shigella	1	2	29	2	0	6		6	6	6	1	58	43	58	43	
Typhoid Fever	0	0	0	0	0	0		0	0	0	0	0	0	0	0	
Parasitic Infections																
Amebiasis	0	0	0	1	0	0		0	0	1	0	2	6	2	6	
Giardiasis	2	6	11	3	0	21		1	2	1	5	52	28	52	28	
Toxoplasmosis	0	0	0	0	0	0		0	0	0	0	0	2	0	2	
Sexually Transmitted Dis.																
AIDS	6	0	2	2	5	1		12	15	14	2	59	54	59	54	
Gonorrhea	70	11	41	79	19	23		1053	1116	364	38	2814	2309	2814	2309	
Genital Herpes	12	7	38	12	28	15		108	94	19	9	342	345	342	345	
Nongonoc. urethritis	29	1	9	25	3	6		159	434	169	20	855	1156	855	1156	
Prim. & sec. syphilis	0	0	1	4	1	0		14	2	2	2	26	13	26	13	
Tuberculosis																
Extrapulmonary	0	0	0	0	0	0	1	0	1	0	0	2	3	2	3	
Pulmonary	1	0	1	3	4	2	0	0	3	0	2	16	22	16	22	
Zoonotic																
Animal Bites	106	8	32	52	28	47		0	0	331	0	604	296	604	296	
Psittacosis	0	0	0	0	0	0		0	00	0	0	0	0	0	0	
Rabies (Animal)	0	0	1	2	0	0		0	0	0	0	3	1	3	1	
Rocky Mtn. Sp. Fever	0	0	0	0	0	0		0	0	0	0	0	0	0	0	
Tularemia	0	0	0	0	1	0		0	0	0	0	1	4	1	4	

Low Frequency Diseases

Anthrax
Botulism
Brucellosis
Chancroid
Cholera
Cryptosporidiosis
Encephalitis (infectious)
Encephalitis (viral/arbo-viral)
Granuloma Inguinale
Kawasaki Disease
Legionnellosis
Leptospirosis
Lymphogranuloma Venereum
Malaria - 1
Plague
Rabies (human)
Reye's Syndrome - 2
Toxic-Shock Syndrome - 1
Trichinosis

Outbreaks

Foodborne/waterborne
Histoplasmosis
Nosocomial - 3
Pediculosis
Scabies
Other - 1

* *Reporting Period Beginning* January 1, *Ending* February 25.
** *Totals do not include KC, SLC, SLCo, or Springfield*
*** *State and Federal Institutions*

Due to data editing, totals may change.

MO 580-0490 (7-88)

*includes Springfield/Greene County totals

Missouri EPIDEMIOLOGIST

Volume XI, Number 2 *May-June 1989*

Lyme Disease Now Reportable in Missouri

Effective June 26, 1989, an emergency amendment filed with the Secretary of State added Lyme disease to the list of Category II diseases that must be reported to the Department of Health (19CSR20-20.020).

Background

Lyme disease is a systemic tickborne illness that usually occurs during the summer. It was first described in the United States in 1975 in Connecticut and is characterized by a distinctive skin lesion called erythema migrans. Other symptoms are fever, headaches, myalgias and arthralgias. Some patients may later develop arthritic, neurological or cardiac complications. The disease is caused by a spirochete organism, *Borrelia burgdorferi*, which is transmitted by the bite of an infected tick. The diagnosis is supported by a positive serologic test or by isolation of the spirochete from a clinical specimen. From 1984 through 1986, CDC received an average of 1,500 reports of Lyme disease annually, making it the most common tickborne disease reported to CDC. Six thousand cases have been diagnosed in the United States since 1980.

Missouri Experience

Cases meeting CDC criteria for definite Lyme disease have been reported in Missouri. Recent review of 112 suspect cases reported since 1983 has revealed that 16 meet the current CDC criteria for definite and 23 meet the current criteria for probable cases. Seven other cases occurred in Missourians who visited other states where Lyme has been endemic.

Definite cases have occurred in Adair, Jasper, McDonald, Moniteau, Polk, Bollinger, Carter, Stoddard and Wayne Counties. Efforts are underway to identify the vector(s) and to confirm the presence of the spirochete by isolation.

Reporting of Lyme disease will assist in determining the incidence and geographic distribution of this disease in Missouri. Health care professionals are urged to report suspected cases to your local health department or to the Department of Health by calling 800/392-0272. ■

For a current copy of Missouri Laws and Rules listing reportable diseases by type, please contact your local health department or the Section of Disease Prevention, P.O. Box 570, Jefferson City, MO 65102, phone 800/392-0272.

MISSOURI LAWS
Accompanied by
DEPARTMENT OF HEALTH
RULES

Governing
The Control
of Communicable and
Other Diseases Dangerous
to Public Health
May 1989

Inside this Issue

Waterborne Illness Outbreak at Golf Course

Summary

A waterborne disease outbreak occurred in August 1988 as a result of contaminated water and ice dispensed at a facility which provided concessions for a golf tournament in Southwest Missouri. The outbreak was investigated by the Department of Health and the Department of Natural Resources. Thirty associated cases of gastrointestinal illness were identified. Contamination of the water was attributed to improper well placement and construction. A specific causative agent was not identified due to lack of stool specimens for laboratory analysis.

Background

Employees of a manufacturing company participated in a golf tournament on Saturday, August 13, 1988. On Tuesday, August 16, a company manager reported that approximately 30 employees were ill with gastrointestinal symptoms. A foodborne outbreak was suspected, and an epidemiologic investigation was initiated by the Southwestern District Health Office environmental health staff.

The food service facility had been inspected several years earlier and found to be unacceptable. Several water samples taken from the facility's private well at that time were unsatisfactory due to contamination with coliform bacteria. The owners chose to close the food service facility rather than renovate the well or chlorinate the water as recommended. The facility was reopened later but the Department of Health was not notified that it was open.

Epidemiologic Investigation

Interviews were conducted with 50 persons, including 47 golfers, the owner of the facility, and two of his family members. Information was collected regarding whether they were ill, symptoms, time of onset and duration of illness, foods and beverages consumed, and the time of consumption. The investigation included inspection of the food service facility, investigation of the well supplying water to the facility, and collection and laboratory analysis of water and ice samples.

An outbreak-related case was defined as a person who had two or more symptoms (nausea, vomiting, diarrhea, abdominal cramps, headache, chills, fever) and who had consumed food, beverage, water or ice at this facility within 96 hours before onset of illness.

Of the 50 persons interviewed, 30 were considered outbreak-related cases. Diarrhea was the most commonly reported symptom (80%), followed by abdominal cramping (77%), nausea (67%), headache (53%), chills (50%), fever (40%), and vomiting (37%). Dates of onset of symptoms ranged from August 13 through August 22. The duration of illness ranged from one-half day to four days, with a median of two days. The cases ranged in age from 19 - 56 years, with a median of 30 years. Most of the cases (87%) were male. Stool specimens were requested from the cases, but none were submitted.

Consumption of water and/or ice at the golf course was significantly related to illness. Cases were 19.5 times more likely than well persons to have consumed water and 18.6 times more likely to have consumed ice. When water and ice were considered together, cases were 67.7 times more likely to have consumed ice, water or both than well persons. Food consumption was not related to illness. Only two persons who reported eating a meal at the facility did not have water or ice; neither became ill.

DOH Sanitation Inspection

A sanitation inspection was conducted on August 17. The facility received a score of 40 on a scale of 100. Of the 44 items on the inspection report, 23 were debited, including several significant items relating to food preparation procedures, temperature controls, and the lack of a handwashing sink in the food preparation area. Most importantly, the water and ice samples had unsatisfactorily high coliform bacteria counts. Fecal coliforms at the level of 25 per 100 ml were found in one of the water samples.

The facility was given ten days to rectify the sanitation problems. The owners were advised to discontinue providing water and ice from the well to customers. They were advised to sell only prepackaged food items and to obtain water and ice from an approved source. Upon reinspection of the facility on September 9, the score improved to 81. However, several significant items were again debited, including the lack of a handwashing sink in the food-preparation area. Another reinspection was scheduled in 30 days. By that time, however, the facility was closed for the season.

DNR Inspection of Water System

DNR performed an onsite inspection of the well August 24 and found that it was inadequately constructed. The liner was not properly fitted at the casing termination, the sanitary seal was not secured, and renovation of the well had not been registered with DNR. Chlorine was introduced into the annular space of the well and was detected in the water within 24 hours. This indicated that the bottom of the casing was not sealed as required.

DNR also determined that two septic tanks and drainfield systems were installed less than 100 feet from this well. One served the house just north of the well, and the other served the concession facility.

Water samples taken on August 24 and September 6 were unsatisfactory due to high total coliform and fecal coliform counts.

A fluorescene dye tracing study done in September, 1988 provided further evidence that contaminated water led to the disease outbreak. The study was undertaken to determine if the well was being contaminated by surface or sub-surface sources of pollutants. One pound of dye was injected into the sewerage treatment system serving the house just north of the well. An activated charcoal packet was placed in the wash basin in the basement of the facility. The dye was absorbed by this packet within one week, indicating a fairly open pathway for contaminants to enter the well.

Followup

Information concerning the provision of potable water and adequate construction and protection of a well was provided to the owner by DOH and DNR. Basic information on food preparation and serving, temperature controls, food storage and personal hygiene were also provided.

During the spring of 1989 a new well, which meets DNR standards for public water supplies, was constructed at the facility. Inspectional monitoring of the food service facility and the water supply system will be continued on a routine basis. Surveillance for disease outbreaks will continue.

Acknowledgements:

The following staff participated in this investigation: Environmental Health staff from the Southwestern District Health Office; staff from the Bureaus of Communicable Diseases and Community Sanitation, State Public Health Laboratory and Southwest Branch Laboratory; DNR Springfield Regional Office; DNR Division of Geology and Land Survey. ■

National Health Objectives for the Year 2000

Priority Areas:

1. Reduce Tobacco Use
2. Reduce Alcohol and Other Drug Abuse
3. Improve Nutrition
4. Increase Physical Activity and Fitness
5. Improve Mental Health and Prevent Mental Illness
6. Reduce Environmental Health Hazards
7. Improve Occupational Safety and Health
8. Prevent and Control Unintentional Injuries
9. Reduce Violent and Abusive Behavior
10. Prevent and Control HIV Infection and AIDS
11. Prevent and Control Sexually Transmitted Diseases
12. Immunize Against and Control Infectious Diseases
13. Improve Maternal and Infant Health
14. Improve Oral Health
15. Reduce Adolescent Pregnancy and Improve Reproductive Health
16. Prevent, Detect, and Control High Blood Cholesterol and High Blood Pressure
17. Prevent, Detect, and Control Cancer
18. Prevent, Detect, and Control Other Chronic Diseases and Disorders
19. Maintain the Health and Quality of Life of Older People
20. Improve Health Education and Access to Preventive Health Services
21. Improve Surveillance and Data Systems

1/10/89

Upcoming Conference:

Where we are,
Where we're going...
AIDS Controversies of the 1990s
October 19-20, 1989
Allis Plaza Hotel, Kansas City, MO

Sponsors:

MO Department of Health, Bureau of AIDS Prevention
Kansas City, MO Health Department AIDS Program
Metropolitan St. Louis AIDS Program
Midwest AIDS Training Education Center (MATEC)

For Information: 314/ 882-4106

Chlamydia trachomatis: Missouri Study

Elmer H. Davis, Health Program Representative , Chlamydia Coordinator
Raymond L. Bly, Chief, Bureau of Sexually Transmitted Diseases
H. Denny Donnell, Jr., M.D., M.P.H., Manager, Section of Disease Prevention

Chlamydia trachomatis has been recognized in recent years as the most common sexually transmitted bacterial pathogen in the United States. *Chlamydia trachomatis* infections became reportable in Missouri in March 1986. The true incidence of this disease is not known but this pathogen plays a major role in Missouri's sexually transmitted disease problem in both male and female residents.

A study was initiated in Missouri to determine the prevalence of *Chlamydia trachomatis* infections in this state. Other studies in the United States have indicated that the prevalence of chlamydia is three to five times that of gonorrhea.

Study Methods

In November 1986, the Bureau of Sexually Transmitted Diseases began a study to determine the occurrence of *Chlamydia trachomatis* infections among special high risk groups in Missouri. This study has continued, with some variations, each year since that time.

All specimens from the study have been tested at the state laboratory in Jefferson City. An antigen detecting enzyme immunoassay test (EIA: Chlamydiazyme) from Abbott Laboratories has been used throughout the entire study. The sensitivity and specificity for this test are 91.6 percent and 98.5 percent respectively.

Thirty-four screening sites were selected for the study in an effort to provide a statewide representative sample of the population. These sites included STD, family planning and prenatal clinics. The guidelines for screening were to include persons with gonorrhea, chlamydia infections, their sexual partners and others at high risk. Testing in these screening sites began in October 1986 and included symptomatic patients only.

Beginning in July 1987, with the same screening sites, the study guidelines were changed to include primarily asymptomatic patients at high risk. Those patients screened were at high risk because of age, marital status or multiple sex partners. Symptomatic individuals and their contacts were routinely treated with dual therapy (medication adequate to treat both gonorrhea and chlamydial infections simultaneously) and not screened for chlamydia.

From July 1, 1988, through March 1989, chlamydia screening efforts have been directed primarily to public prenatal and family planning clinics. The Missouri Community Health Corporation received funding for chlamydia trachomatis testing in family planning clinics and has offered chlamydia screening in these clinics during this period of time. State funds have been utilized primarily in prenatal clinics. These specimens are also tested at the State Public Health Laboratory in Jefferson City.

Findings

In the eight months from October 1986 - June 1987, there were 7,812 persons tested with an overall positivity rate of 16.8 percent. (See Table I) In the twelve months from July 1987 through June 1988, a total of 9,172 persons were screened for chlamydia with an overall positivity rate of 14.6 percent. From July 1988 through March 1989, there were 5,436 persons screened and the positivity rates for all public clinics was 13.8 percent.

The highest percent of chlamydia positives was found in Kansas City in the first and third year of the study with 18.3 percent positive for the period October 1986 through June 1987 and 15 percent for the period July 1988 through March 1989. St. Louis had the highest positivity rate the second year of the survey, July 1987 through June 1988, with 16.1 percent positive.

The age group under 20 years old produced 28.2 percent positive the first year of the study, 25.7 percent the second and 21.2 percent during the third year. This age group had the highest percentage positive in each of these years. The highest age group consistently had the lowest percent positivity.

The percent of contacts to chlamydia is consistently higher in women than in men with the positivity rate for women during the first year of the study at 25.5 percent with 24.3 percent the second and 27.0 percent the third year. Men had a positivity rate of 17.5 percent the first year, 17.6 percent the second and 22.3 percent the third year.

Discussion

The positivity rate for chlamydia testing has varied from a high of 16.8 percent in 1986 to a low of 13.8 percent in 1989. These percentages are significantly higher than the gonorrhea positivity percentages seen in culture screening sites which normally fluctuate between four-five percent positive. Based solely on laboratory test results, this seems to indicate that *Chlamydia trachomatis* infections are more prevalent in Missouri than gonorrhea.

The steady decline in the positivity rate for chlamydia testing which has occurred each year from October 1986 through March of 1989 is believed to be related to the change in individuals tested. In 1986, testing was

done in STD clinics, family planning clinics and prenatal clinics. In April 1988, testing was almost stopped in STD clinics and was intensified in prenatal and family planning clinics. The elimination of STD clinic testing, which normally yields a high positivity rate, and shifting the testing to family planning and prenatal clinics is believed to have contributed to reducing the percent positive in 1988 and 1989.

In calendar year 1988, there were 6,239 cases of *Chlamydia trachomatis* reported. One thousand and twenty one of these cases were males while 5,218 were females. This ratio occurred because in STD clinics, male sex partners to chlamydia infections are given dual therapy, screened for gonorrhea and not screened for chlamydia infection because of the cost factor.

Testing for chlamydia is much more costly than gonorrhea. This makes unrestricted screening of patients in all clinic settings impractical. Treating chlamydial infections in STD clinics is much less expensive than screening and then treating. It has also been established through a number of studies that approximately 39-50 percent of gonorrhea patients will also test positive for chlamydia.

Chlamydia causes an estimated four-five million infections each year in this country at a cost of approximately $1.5 billion. Men, women and infants are affected, but women are at greatest risk for serious complications, including adverse reproductive consequences such as ectopic pregnancy and infertility. Chlamydia accounts for 25-50 percent of the one million recognized cases of pelvic inflammatory disease (PID) each year in the United States.

In men, Chlamydia trachomatis causes approximately one-half the non-gonococcal urethritis. The incidence of this infection is estimated to be 2.5 times that of gonococcal urethritis. In addition, Chlamydia causes about one-half of the estimated annual 500,000 cases of acute epididymitis, a painful, serious complication that may result in male sterility.

In women, Chlamydia trachomatis most often begins as a silent infection of the cervix known as cervicitis. When chlamydia ascends further, to the fallopian tubes and ovaries, it produces a chronic condition known as Pelvic Inflammatory Disease (PID). Chlamydial PID contributes significantly to the increasing number of women who have ectopic pregnancies or become infertile. Chlamydial maternal infections have been associated with postpartum endometritis and increased perinatal mortality.

About 60-70 percent of infected mothers transmit chlamydia to the newborn during the birth process. Each year, an estimated 155,000 infants are born to mothers infected with Chlamydia in the United States and of these, approximately 30,000 develop chlamydial pneumonia. These newborns are also at high risk for developing inclusion conjunctivitis and are at slightly elevated risk of having otitis media and bronchiolitis[1].

It is important for the clinician to remember that up to 30 percent of men and up to 70 percent of women who test positive for chlamydia have no symptoms. In the management of chlamydia, sexual partner(s) should be examined for sexually transmitted diseases and promptly treated for *Chlamydia trachomatis* with an appropriate treatment regimen. This group includes sex partners of individuals with sexually acquired chlamydia infection, mothers of infected newborns, and the sex partners of these mothers.

[1]Chlamydia Trachomatis Infections, Policy for Prevention and Control, U.S. Department of Health and Human Services, August 1985, Pages 1 - 2. ■

Table I

Chlamydia Screening - Percent Positive

	October 1986 - June 1987	July 1987 - June 1988	July 1988 - March 1989
Location			
St. Louis	16.3	16.1	12.9
Kansas City	18.3	13.3	15.0
Outstate Missouri	16.2	14.2	13.5
Missouri Total	16.8	14.6	13.8
Male and Females by Symptoms			
MALE			
Urethritis	21.9	18.5	19.6
Epididymitis	9.1	17.6	23.1
All Other	13.6	9.3	12.0
Total Males	16.6	11.8	14.1
FEMALE			
Mucopurulent Cerv.	22.8	20.6	17.8
PID	19.6	13.6	18.5
All Other	15.3	14.6	12.8
Total Females	16.9	15.6	13.8
Contacts to Chlamydia Trachomatis			
Male	17.5	17.6	22.3
Female	25.5	24.3	27.0
BY AGE			
Under 20	28.2	25.7	21.2
20 - 29	15.1	12.4	11.2
30 and Over	6.3	4.8	4.3
Age Unknown	14.3	11.6	12.9
Total	16.8	14.6	13.8
Prenatal by Selected Categories			
Age Under 20	21.9	25.4	18.9
Unmarried	16.6	20.6	15.4
Multiple Sex Partners	21.0	20.9	17.5
History of STD	15.9	15.2	15.1
Total	15.1	22.2	12.8

Rubella Vaccination during Pregnancy — United States, 1971-1988

The following is reprinted from the May 4, 1989 Morbidity and Mortality Weekly Report

Since licensure of live attenuated rubella vaccine in 1969, the Immunization Practices Advisory Committee (ACIP) of the Public Health Service has stated that pregnancy is a contraindication to rubella vaccination because of concerns regarding the theoretical possibility of adverse effects on the developing fetus. Because of this concern and because the Cendehill and HPV-77 vaccine virus strains (introduced in 1969) could cause intrauterine rubella infections (1), CDC established in 1971 the Vaccine in Pregnancy (VIP) registry of women who had received either of these two rubella vaccines within 3 months before or after conception (2). None of the 290 infants born to the 538 women entered into this registry through April 1979 had defects indicative of congenital rubella syndrome (CRS); this included 94 live-born infants of women who were known to be susceptible* before receiving the vaccine (3,4).

In January 1979, the RA 27/3 rubella vaccine was licensed for use in the United States. Concerns were raised that this new live attenuated-virus vaccine might have greater fetotropic and teratogenic potential than the earlier vaccines because this virus was isolated from and propagated in human tissue. Thus, women known to be susceptible to rubella who received the RA 27/3 vaccine within 3 months of their estimated date of conception have subsequently been enrolled in the VIP registry. Throughout 1979-1987, an average of 30 susceptible women were enrolled annually; for 1988, 21 women were enrolled. From 1979 through December 31, 1988, final reports have been received for 272 enrollees from physicians and health departments in 49 reporting areas (including 46 of the 50 U.S. states, the District of Columbia, Puerto Rico, and Canada); the largest numbers of enrollees have been reported from California (34 enrollees (13% of the total)) and Georgia (33 (12% of the total)).

Outcomes of pregnancy are known for 254 (93%) of the 272 susceptible women enrolled between 1979 and 1988 (Table 1). Of these 254 women, 210 (83%) delivered 212 living infants, and 13 (5%) had spontaneous abortions; 31 (12%) pregnancies were terminated. The interval between date of vaccination and estimated date of conception is known for all 210 susceptible women who had full-term pregnancies (Figure 1). The median interval for these women was -14 days (i.e., they received vaccine 14 days before conception). Of the 212 live-born infants, the average gestational age at birth was 39.5plus or minus 2.0 weeks and the average birth weight was 3384plus or minus 521 grams. For the 13 women whose pregnancies ended in spontaneous abortions, the median interval between vaccination and conception was -13 days, and five (38%) were vaccinated during the period of highest risk.

Findings were comparable when the subset of 92 women who were vaccinated within 1 week before to 4 weeks after conception (the period of presumed highest risk for viremia and fetal malformations (5,6)) was analyzed. Pregnancy outcomes were known for 88 (96%) of these women: 73 (83%) delivered 74 living infants, and five (6%) had spontaneous abortions; 10 (11%) pregnancies were terminated. Of the 74 live-born infants, the average gestational age at birth was 39.5plus or minus 2.1 weeks, and the average birth weight was 3257plus or minus 535 grams.

None of the 212 live-born infants had defects indicative of CRS. Although two infants had asymptomatic glandular hypospadias (which has been anecdotally suggested to be part of the CRS constellation of symptoms (4)), including one whose mother had been vaccinated within one week before her estimated date of conception, both had negative rubella-specific IgM titers** (less than 1:4) in cord blood at birth. A 6-month follow-up serum specimen, available for one of the infants, showed a rubella HI antibody titer of less than 1:8 (i.e., a negative titer).

Overall, serologic evaluations were performed on 154 (73%) of the 212 live-born infants, including 43 (58%) of the 74 infants who were exposed during the period of

*Women who had had negative serologic tests for rubella within 1 year before vaccination were considered susceptible at vaccination.

**Since July 1985, the CDC laboratory has tested for rubella-specific IgM antibody using an indirect enzyme immunosorbent assay (EIA) with an enzyme-conjugated antihuman IgM serum. An IgM index is calculated for each serum specimen using a known low-positive IgM serum specimen as a reference standard. An IgM index greater than or equal to 1.0 is considered positive, with increasing values indicating increasing antibody levels. Before July 1985, the CDC laboratory performed sucrose density gradient centrifugation and hemagglutination-inhibition (HI) tests for rubella-specific IgM.

highest risk. Three (2%) of the 154 infants, including one (1%) infant born to a mother vaccinated during the period of highest risk, were normal on physical examination but had a positive rubella-specific IgM titer in cord blood, suggesting a subclinical infection. The first (infant A), born in 1981, had a rubella-specific IgM antibody titer of 1:8 in cord blood and an initial corresponding HI titer of 1:128. The maternal HI titer was also 1:128. Simultaneous retesting of the cord blood and testing of a follow-up specimen taken when the infant was 2 months old showed a decrease in HI antibody titer from 1:64 to 1:16 over the 2-month period, suggesting that the cord blood HI titer was passively transferred maternal antibody and that subclinical infection may not have occurred. Infant A had no defects indicative of CRS at 18-month and 29-month follow-up examinations. Since 1985, two additional apparently healthy infants had positive rubella IgM titers in cord serum. Infant B had an IgM EIA index of 1.9, and infant C (whose mother had been vaccinated within 4 weeks after her estimated date of conception) had an index of 2.9. Both mothers had positive IgM indices at delivery; mother B had an index of 4.2 on a serum specimen drawn 11 months after vaccination, and mother C had an index of 2.5 on a serum specimen drawn 9 months after vaccination. No clinical or serologic follow-up was available for either of these infants.

Editorial Note: Data collected by CDC in the VIP registry since 1979 show no evidence that the RA 27/3 rubella vaccine administered in pregnancy can cause defects indicative of CRS. These data include information for 379 women whose immune status were not known, 32 immune women, and 272 women known to be susceptible at vaccination (7). Previous reviews of data collected before April 1979 on 538 women vaccinated during pregnancy with either Cendehill or HPV-77 rubella vaccines have shown no CRS-indicative outcomes (2,3,8). Therefore, the observed risk for CRS following rubella vaccination continues to be zero. These results are consistent with the experiences in the Federal Republic of Germany and the United Kingdom (9,10), where rubella vaccine has not been associated with CRS among infants born to susceptible mothers who were vaccinated around the time of conception.

Based on the 95% confidence limits of the binomial distribution, the theoretical maximal risk for CRS in the group of 212 live-born infants of susceptible women who received RA 27/3 vaccine is 1.7%; the overall maximal risk for all known susceptible women vaccinated during pregnancy with any of the three types of vaccine since 1971 is 1.2% (Table 2). If the analysis is limited to the 74 infants born to mothers vaccinated with RA 27/3 within 1 week before to 4 weeks after conception, the corresponding maximal theoretical risk is 4.9%. These estimates are less than the 20% or greater risk of CRS associated with maternal infection with wild rubella virus during the first trimester (2,11) and are comparable with the 2%-3% rate of major birth defects observed in the absence of exposure to rubella vaccine (12). A sample of approximately 375 susceptible women would be required to lower the overall maximal theoretical risk below 1% for receipt of the RA 27/3 vaccine, assuming that no CRS-like anomalies are observed. At the observed average rate of annual enrollment into the VIP registry, this sample size might be attained by 1992 for all women vaccinated within 3 months of conception; however, at this same rate of enrollment, a similar number of women vaccinated in the highest-risk period would not be enrolled until 2023. In either case, the maximal risk can never be lowered to zero.

Although no CRS-like defects have been noted, rubella vaccine viruses can cross the placenta and infect the fetus. The rubella virus isolation rate from the products of conception for the RA 27/3 vaccine was 3% (1/35), and the rate of virus isolation for Cendehill and HPV-77 vaccines was 20% (17/85) (2). Thus, because of this evidence and because the theoretical risk to the fetus, however small, cannot be absolutely ruled out, the ACIP continues to state: 1) pregnancy remains a contraindication to rubella vaccination because of the theoretical, albeit small, risk of CRS; 2) reasonable precautions should be taken to preclude vaccination of pregnant women, including asking women if theyare pregnant, excluding those who say they are, and explaining the theoretical risks to the others; and 3) if vaccination occurs within 3 months before or after conception, the risk of CRS is so small as to be negligible; thus, inadvertent vaccination of a pregnant woman should not be a reason in itself to consider interruption of pregnancy. The patient and her physician, however, should make the final decision (13).

The results obtained from the VIP registry data also provide adequate support for the recommendations that routine laboratory screening for both pregnancy and rubella antibody is not necessary before administration of vaccine and that physicians and other health-care personnel should offer rubella vaccine whenever they encounter a potentially susceptible*** woman lacking contraindications for vaccination. Thus, the essential purposes for which the VIP registry was initiated have

***Persons are considered susceptible unless they can present documentation of laboratory evidence of immunity and/or documentation of adequate immunization with rubella vaccine on or after their first birthday (13).

been accomplished. Therefore, as of April 30, 1989, CDC discontinued accepting new enrollees into the VIP registry. All women enrolled before that date will be followed to completion of their pregnancy, and the final data will be analyzed for a summary report.

However, all suspected cases of CRS, whether presumed to be due to wild-virus or vaccine-virus infection, should continue to be reported through state and local health departments.

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Missouri EPIDEMIOLOGIST

Published by the
Missouri Department of Health
Division of Environmental Health
and Epidemiology Services
P.O. Box 570, 1730 E. Elm Street
Jefferson City, MO 65102-0570
Telephone: (314) 751-6080
Toll-free No.: 800-392-0272

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Recommendations of the Immunization Practices Advisory Committee Prevention and Control of Influenza: Part I, Vaccines

These recommendations update information on the vaccine available for controlling influenza during the 1989-90 influenza season (superseding MMWR 1988;37: 361-73). Changes include statements about 1) updating of the influenza strains in the trivalent vaccine for 1989-90, 2) revision of the high-priority groups for immunization, 3) increased emphasis on the need for vaccination of health-care workers and household contacts of high-risk persons, 4) vaccination for travelers, and 5) review of strategies for reaching high-risk groups with vaccine.

Antiviral agents also have an important role in the control of influenza. Recommendations for the use of antiviral agents will be published in the summer or fall of 1989 as Part II of these recommendations.

INTRODUCTION

Influenza A viruses are classified into subtypes on the basis of two antigens: hemagglutinin (H) and neuraminidase (N). Three subtypes of hemagglutinin (H1, H2, H3) and two subtypes of neuraminidase (N1, N2) are recognized among influenza A viruses that have caused widespread human disease. Immunity to these antigens, especially the hemagglutinin, reduces the likelihood of infection and lessens the severity of disease if infection occurs. However, over time, there may be enough antigenic variation (antigenic drift) within the same subtype that infection or vaccination with one strain may not induce immunity to distantly related strains of the same subtype. Although influenza B viruses have shown more antigenic stability than influenza A viruses, antigenic variation does occur. For these reasons, major epidemics of respiratory disease caused by new variants of influenza continue to occur. The antigenic characteristics of current strains provide the basis for selecting virus strains included in each year's vaccine.

Typical influenza illness is characterized by abrupt onset of fever, sore throat, and nonproductive cough. Unlike many other common respiratory infections, influenza can cause extreme malaise lasting several days. More severe illness can result if the influenza virus invades the lungs (primary viral pneumonia) or if secondary bacterial pneumonia occurs. High attack rates of acute illness during influenza epidemics usually result in dramatic increases in visits to physicians' offices, walk-in clinics, and emergency rooms by persons of all ages and in increases in hospitalizations for management of lower-respiratory-tract complications.

Elderly persons and persons with underlying health problems are at increased risk for complications of influenza infection. Such high-risk persons are more likely than the general population to require hospitalization if infected. One recent study showed that, during major epidemics, hospitalization rates for high-risk adults increased twofold to fivefold, depending on age group. Previously healthy children and younger adults may also require hospitalization for influenza-related complications, but the relative increase in their hospitalization rates is less than for persons in high-risk groups.

An increase in mortality further indicates the impact of influenza epidemics. Increased mortality results from not only pneumonia but also cardiopulmonary or other chronic diseases that can be exacerbated by influenza infection. Ten thousand or more excess deaths have been documented in each of 19 different epidemics during 1957-1986; more than 40,000 excess deaths occurred in each of several recent epidemics. Approximately 80%-90% of the excess deaths attributed to pneumonia and influenza were among persons greater than or equal to 65 years of age. However, influenza-associated deaths also occur in children and epidemics.

Because the proportion of elderly persons in the U.S. population is increasing and because age and its associated chronic diseases are risk factors for severe influenza illness, the toll from influenza can be expected to increase unless control measures are used more vigorously. The number of younger persons at high risk for infection-related complications is also increasing for various reasons, such as the success of neonatal intensive-care units, better management of diseases such as cystic fibrosis, and better survival rates for organ-transplant recipients.

OPTIONS FOR THE CONTROL OF INFLUENZA

Two measures are available in the United States to reduce the impact of influenza: immunoprophylaxis with inactivated (killed-virus) vaccine and chemoprophylaxis or therapy with an influenza-specific antiviral drug (e.g., amantadine). Vaccination of high-risk persons each year before the influenza season is the most important measure for reducing the impact of influenza. Vaccination can be highly cost-effective 1) when it is aimed at persons who are most likely to experience complications or who have a higher-than-average risk for exposure and 2) when it is administered to high-risk persons during a hospitalization or routine health-care visit before the influenza season, thus making special visits to physicians' offices or clinics unnecessary. Recent reports indicate that, when vaccine and epidemic strains of virus are well matched, achieving high vaccination rates in closed populations can reduce the risk of outbreaks by inducing herd immunity. When outbreaks of influenza A occur in closed populations, they can be interrupted by chemoprophylaxis for all residents. (Additional information on chemoprophylaxis will be published in the MMWR before the 1989-90 season.)

Other indications for immunization include the strong desire of any person to avoid an influenza infection, reduce the severity of disease, or reduce the chances of transmitting influenza to high-risk persons with whom they have frequent contact.

INACTIVATED VACCINE FOR INFLUENZA A AND B

Influenza vaccine is made from highly purified, egg-grown viruses that have been rendered noninfectious (inactivated). Influenza vaccine contains three virus strains (two type A and one type B) representing influenza viruses recently circulating worldwide and believed

likely to circulate in the United States the following winter. The composition of the vaccine is such that it causes minimal systemic or febrile reactions. Whole-virus, subvirion, and purified surface antigen preparations are available. Only subvirion or purified surface antigen preparations should be used for children to minimize febrile reactions. Subvirion, purified surface antigen, or whole- virus vaccines may be used in adults. Most vaccinated children and young adults develop high postvaccination hemagglutination-inhibition antibody titers that are likely to protect them against infection by strains like those in the vaccine and often by related variants that may emerge. Elderly persons and persons with certain chronic diseases may develop lower postvaccination antibody titers than healthy young adults and thus may remain susceptible to influenza upper-respiratory-tract infection. Nevertheless, influenza vaccine can still be effective in preventing lower-respiratory-tract involvement or other complications, thereby reducing the risk of hospitalization and death.

RECOMMENDATIONS FOR INACTIVATED INFLUENZA VACCINE

Influenza vaccine is strongly recommended for any person greater than or equal to 6 months of age who, by virtue of age or underlying medical condition, is at increased risk for complications of influenza. It is strongly recommended for health-care workers and others (including household members) who may have close contact with high-risk persons. In addition, influenza vaccine may be given to any other person who wishes to reduce their chance of becoming infected with influenza, even if that person is not at increased risk for complications. Vaccine composition and dosages for the 1989-90 season are given in Table 1. Guidelines for the use of vaccine among different groups are given below. Although the current influenza vaccine often contains one or more antigens used in previous years, immunity declines in the year following vaccination. Therefore, annual vaccination using the current vaccine is required. Remaining 1988-89 vaccine should not be used to provide protection for the 1989-90 influenza season.

Two doses may be required for a satisfactory antibody response in previously unvaccinated children less than or equal to 12 years of age; however, clinical studies with vaccines similar to those in current use have shown only marginal or no improvement in antibody response when a second dose is given to adults during the same season.

During the past decade, data on influenza vaccine immunogenicity and side effects have generally been obtained when vaccine has been administered intramuscularly. Because there has been no adequate evaluation of recent influenza vaccines administered by other routes, the intramuscular route should be used. Adults and older children should be vaccinated in the deltoid muscle, and infants and young children, in the anterolateral aspect of the thigh.

TARGET GROUPS FOR SPECIAL VACCINATION PROGRAMS

To maximize protection of high-risk persons, both the persons at risk and their close contacts should be targeted for organized vaccination programs.

Groups at Increased Risk for Influenza-Related Complications

1. Adults/children with chronic disorders of the pulmonary or cardiovascular systems, including children with asthma.
2. Residents of nursing homes and chronic- care facilities housing any patients with chronic medical conditions.
3. Persons greater than or equal to 65 years of age.
4. Adults and children who have required regular medical follow-up or hospitalization during the preceding year because of chronic metabolic diseases (including diabetes mellitus), renal dysfunction, hemoglobinopathies, or immunosuppression.
5. Children and teenagers (aged 6 months-18 years) who are receiving long-term aspirin therapy and therefore may be at risk of developing Reye syndrome after an influenza infection.

Groups Potentially Capable of Transmitting Influenza to High-Risk Persons

Persons attending high-risk persons can transmit influenza infections to them while they themselves are undergoing subclinical infection or working despite the existence of symptoms. Some high-risk persons (e.g., the elderly, transplant recipients, or persons with acquired immunodeficiency syndrome (AIDS)) can have relatively low antibody responses to influenza vaccine. Efforts to protect them against influenza may be improved by reducing the chances that their care providers may expose them to influenza. Therefore, the following groups should be vaccinated:

1. Physicians, nurses, and other personnel in both hospital and outpatient-care settings who have extensive contact with high-risk patients in all age groups, including infants.
2. Providers of home care to high-risk persons (e.g., visiting nurses, volunteer workers).
3. Household members (including children) of high-risk persons.

Table I —Influenza vaccine* dosage, by patient age — United States, 1989-90 season

Age Group	Product^	Dosage	No. Doses	Route+
6-35 mos	Split virus only	0.25 mL	1 or 2**	IM
3-12 yrs	Split virus only	0.50 mL	1 or 2**	IM
>12 yrs	Whole or split virus	0.50 mL	1	IM

*Contains 15 ug each of A/Taiwan/1/86-like (H1N1), A/Shanghai/11/87-like (H3N2), and B/Hamagata/16/88-like hemagglutinin antigens in each 0.5 mL.

^Because of the lower potential for causing febrile reactions, only split-virus vaccines should be used in children ("split virus" refers to viruses that have been chemically treated to reduce the level of potentially pyrogenic components). They may be labeled as "split," "subvirion," or "purified surface antigen" vaccine. Immunogenicity and side effects of split- and whole-virus vaccines are similar in adults when vaccines are used according to the recommended dosage.

+The recommended site of vaccination is the deltoid muscle for adults and older children. The preferred site for infants and young children is the anterolateral aspect of the thigh.

**Two doses are recommended for children ≤ 12 years old who are receiving influenza vaccine for the first time.

VACCINATION OF OTHER GROUPS

General Population

Physicians should administer influenza vaccine to any person who wishes to reduce his/her chances of acquiring influenza infection. Persons who provide essential community services and students or other persons in institutional settings (i.e., schools and colleges) may be considered for vaccination to minimize the disruption of routine activities during outbreaks.

Pregnant Women

Influenza-associated excess mortality among pregnant women has not been documented, except in the largest pandemics of 1918-19 and 1957-58. However, pregnant women who have other medical conditions that increase their risk for complications from influenza should be vaccinated, as the vaccine is considered safe for pregnant women. Administering the vaccine after the first trimester is a reasonable precaution to minimize any concern over the theoretical risk of teratogenicity. However, it is undesirable to delay vaccination of pregnant women with high-risk conditions who will still be in the first trimester of pregnancy when the influenza season begins.

Persons Infected with HIV

Increases in infections and complications caused by various respiratory pathogens have been observed in persons infected with HIV. However, similar increases due to influenza have not been reported during recent epidemics. Nevertheless, because influenza may result in serious illness and complications in some HIV-infected persons, vaccination is a prudent precaution.

Foreign Travelers

Increasingly, the elderly and persons with high-risk medical conditions are embarking on international travel. The risk of exposure to influenza during foreign travel varies, depending on, among other factors, season of travel and destination. Influenza can occur throughout the year in the tropics; the season of greatest influenza activity in the Southern Hemisphere is April-September. Because of the short incubation period for influenza, exposure to the virus during travel will often result in clinical illness that begins during travel, an inconvenience or potential danger, especially for persons at increased risk for complications. Persons preparing to travel to the tropics at any time of year or to the Southern Hemisphere during April-September should review their vaccination histories. If not vaccinated the previous fall/winter, they should be considered for influenza vaccination before travel. Persons in the high-risk categories especially should be encouraged to receive the vaccine. The most current available vaccine should be used. High-risk persons given the previous season's vaccine before travel should be revaccinated in the fall/winter with current vaccine.

PERSONS WHO SHOULD NOT BE VACCINATED

Inactivated influenza vaccine should not be given to persons known to have an anaphylactic hypersensitivity to eggs. Persons with acute febrile illnesses usually should not be vaccinated until their symptoms have abated.

SIDE EFFECTS AND ADVERSE REACTIONS

Because influenza vaccine contains only noninfectious viruses, it cannot cause influenza. Occasional cases of respiratory disease following vaccination represent coincidental illnesses unrelated to influenza vaccination. The most frequent side effect of vaccination is soreness around the vaccination site for up to 2 days; this occurs in less than one third of vaccinees.

In addition, the following two types of systemic reactions have occurred:

1. Fever, malaise, myalgia, and other systemic symptoms occur infrequently and most often affect persons who had no exposure to the influenza virus antigens in vaccine (e.g., young children). These reactions begin 6-12 hours after vaccination and can persist for 1-2 days.
2. Immediate, presumably allergic, reactions (such as hives, angioedema, allergic asthma, or systemic anaphylaxis) occur extremely rarely after influenza vaccination. These reactions probably result from hypersensitivity to some vaccine component—most likely residual egg protein. Although current influenza vaccines contain only a small quantity of egg protein, this protein is presumed capable of inducing immediate hypersensitivity reactions in persons with severe egg allergy, and such persons should not be given influenza vaccine, including persons who develop hives, have swelling of the lips or tongue, or experience acute respiratory distress or collapse after eating eggs. Persons with a documented immunoglobulin E (IgE)-mediated hypersensitivity to eggs, including those who have had occupational asthma or other allergic responses from occupational exposure to egg protein, may also be at increased risk for reactions from influenza vaccine. Unlike the 1976 swine influenza vaccine, subsequent vaccine prepared from other virus strains have not been associated with an increased frequency of Guillain-Barre syndrome. Although influenza vaccination can inhibit the clearance of warfarin and theophylline, clinical studies have consistently failed to show any adverse effects attributable to these drugs in patients receiving influenza vaccine.

SIMULTANEOUS ADMINISTRATION OF OTHER VACCINES, INCLUDING CHILDHOOD VACCINES

The target groups for influenza and pneumococcal vaccination overlap considerably. Both vaccines can be given at the same time at different sites without increasing side effects. However, influenza vaccine must be given annually, and with few exceptions, pneumococcal vaccine should be given only once.

High-risk children usually see a health professional to receive routine pediatric vaccines. These visits provide a good opportunity to administer influenza vaccine simultaneously but in a different site. Although studies have not been conducted, simultaneous administration should not diminish immunogenicity or increase adverse reactions.

TIMING OF INFLUENZA VACCINATION ACTIVITIES

Influenza vaccine may be offered to high-risk persons presenting for routine care or hospitalization beginning in September but not until new vaccine is available. Except in years of pandemic influenza (e.g., 1957 and 1968), high levels of influenza activity generally do not occur in the contiguous 48 states before December. Therefore, organized vaccination campaigns in which high-risk persons are routinely accessible are opti-

mally undertaken in November. In facilities such as nursing homes, it is particularly important to avoid administering vaccine too far in advance of the influenza season because antibody level begins to decline within a few months. Such vaccination programs may be undertaken as soon as current vaccine is available in September or October if regional influenza activity is expected to begin earlier than usual.

Children less than or equal to 12 years of age who have not been vaccinated previously should receive two doses at least 1 month apart to maximize the chance of a satisfactory antibody response to all three vaccine antigens. The second dose should be given before December, if possible. Vaccine should continue to be offered to both children and adults up to and even after influenza virus activity is documented in a community, which may be as late as April in some years.

STRATEGIES FOR IMPLEMENTING INFLUENZA VACCINE RECOMMENDATIONS

Despite the recognition that optimum medical care for both adults and children includes regular review of immunization records and administration of vaccines as appropriate, in recent years, an average of less than 30% of persons in high-risk groups have received influenza vaccine each year. More effective strategies for delivering vaccine to high-risk persons, their health-care providers, and their household contacts are clearly needed.

In general, successful vaccination programs have been those that have combined education for health-care workers, publicity and education targeted toward potential recipients, a routine for identifying (usually by medical record review) persons at risk, and efforts to remove administrative and financial barriers that prevent persons from receiving the vaccine. Persons for whom influenza vaccine is recommended can be identified and immunized in Outpatient Clinics and Physicians' Offices.

Staff in physicians' offices, clinics, health maintenance organizations, and employee health clinics should be instructed to identify and mark the medical records of patients who should receive vaccine. Vaccine should be offered during visits beginning in September and continuing through the influenza season. Offer of vaccine and its receipt or refusal should be documented in the medical record. Patients in high-risk groups who do not have regularly scheduled visits during the fall should be reminded by mail or telephone of the need for vaccine, and if possible, arrangements should be made to provide vaccine with minimal waiting time and at the lowest possible cost.

Facilities Providing Episodic/Acute Care (e.g., emergency rooms, walk-in clinics)

Health-care providers in these settings should be familiar with influenza vaccine recommendations and should offer vaccine to persons in high-risk groups or should provide written information on why, where, and how to obtain the vaccine. Written information should be available in Spanish or other language(s) appropriate for the population served by the facility.

Nursing Homes and Other Residential Long-Term Care Facilities

Immunization should be routinely provided to residents of chronic-care facilities, with concurrence of physicians, rather than by procuring orders for administration of vaccine for each patient. Consent for immunization should be obtained at the time of admission to the facility, and all residents immunized at one period of time immediately preceding the influenza season. Residents admitted after completion of the vaccination program should be immunized at admission during winter months.

Acute-Care Hospitals

Patients of any age in medically high-risk groups and all persons greater than or equal to 65 years of age who are hospitalized from September through March should be offered and strongly encouraged to receive vaccine before discharge. Household members and others with whom they will have contact should receive written information about reasons they should also receive influenza vaccine and places to obtain the vaccine.

Outpatient Facilities Providing Continuing Care to High-Risk Patients (hemodialysis centers, hospital specialty-care clinics, outpatient rehab programs)

All patients should be offered vaccine at one period of time shortly before the beginning of the influenza season. Patients admitted during the winter months after the vaccination program should be immunized at
the time of admission for care. Household members should receive written information regarding need for immunization and places to obtain vaccine.

Visiting Nurses and Others Providing Home Care to High-Risk Persons

Nursing-care plans should identify high-risk patients, and vaccine should be provided in the home if necessary. Caregivers and others in the household should be referred for immunization.

Facilities Providing Services to Persons greater than or equal to 65 Years of Age (e.g., retirement communities, recreation centers)

If possible, all unimmunized residents/attendees should be offered vaccine on site at one time period before the influenza season; alternatively, education/publicity programs should emphasize need for vaccine and should provide specific information on how, where, and when to obtain it.

Clinics and Others Providing Health Care for Travelers

Indications for influenza vaccine should be reviewed before travel and vaccine offered if appropriate (see previous section: Vaccination for Foreign Travelers).

Health-Care Workers

Administrators of all of the above facilities and organizations should arrange for influenza vaccine to be offered to all personnel before the influenza season. Personnel should be provided with appropriate educational materials and strongly encouraged to receive vaccine, with particular emphasis on immunization of persons caring for highest-risk patients (i.e., staff of intensive-care units (including newborn intensive-care units) and chronic-care facilities). Use of a mobile cart to take vaccine to hospital wards or other worksites, and availability of vaccine during night and weekend workshifts may enhance compliance, as may a follow-up campaign if an outbreak threatens. ■

Educational materials about influenza and its control are available from your local health department or the Missouri Department of Health, 314/ 751-6133.

Infectious Waste: Definition and Management

Patrick E. Phillips, D.V.M., M.S.P.H., Consultant Epidemiologist

Among the bills passed and signed into Missouri law by Governor John Ashcroft in 1988 was Senate Bill 435. This bill dealt primarily with the solid waste management system in Missouri, but also identified a new category of waste to be regulated —infectious waste.

In the past, this kind of waste had been known by any number of names, e.g., medical waste, special waste and "sanitary" *(sic)* waste. The Missouri Department of Health (DOH) was given the responsibility for defining infectious waste for small quantity generators and hospitals while the Department of Natural Resources (DNR) defined the procedure for regulation of off-site transportation and treatment or disposal of infectious waste in industrial quantities (more than 100 kg/month).

CSR20-20.010 defines infectious waste for small-quantity generators:

(13) Infectious Waste is waste capable of producing an infectious disease. For a waste to be infectious, it must contain pathogens with sufficient virulence and quantity so that exposure to the waste by a susceptible host could result in an infectious disease. Infectious waste generated by small quantity generators shall include the following categories:

(a) Sharps —Discarded sharps including hypodermic needles, syringes and scalpel blades. Broken glass or other sharp items that have come in contact with material defined as infectious are included;

(B) Cultures and stocks of infectious agents and associated biologicals —Included in this category are all cultures and stocks of infectious organisms as well as culture dishes and devices used to transfer, inoculate and mix cultures; and

(C) Other wastes —Those wastes designated by the medical authority responsible (physician, podiatrist, dentist, veterinarian) for the care of the patient which may be capable of producing an infectious disease.

(17) Person is any individual, partnership, corporation, association, institution, city, county, other political subdivision authority, state agency or institution or federal agency or institution.

20) Small quantity generator of infectious waste is any person generating 100 kilograms (100 kg) or less of infectious waste per month and as regulated in 10CSR80.

Chapter 197.020 defines hospital as —*Hospital means a place devoted primarily to the maintenance and operation of facilities for the diagnosis, treatment or care for not less than 24 hours in any week of three or more nonrelated individuals suffering from illness, disease, injury, deformity or other abnormal physical conditions; or a place devoted primarily to provide for not less than 24 hours in any week medical or nursing care for three or more nonrelated individuals. The term "hospital" does not include convalescent, nursing, shelter or boarding homes as defined in chapter 198, RSMo.*

The small-quantity generator may designate additional categories of waste not specifically identified by regulations as infectious waste. For example, a veterinarian may designate empty *Brucella abortus* Strain 19 vaccine tanks as infectious waste and then handle such waste appropriately.

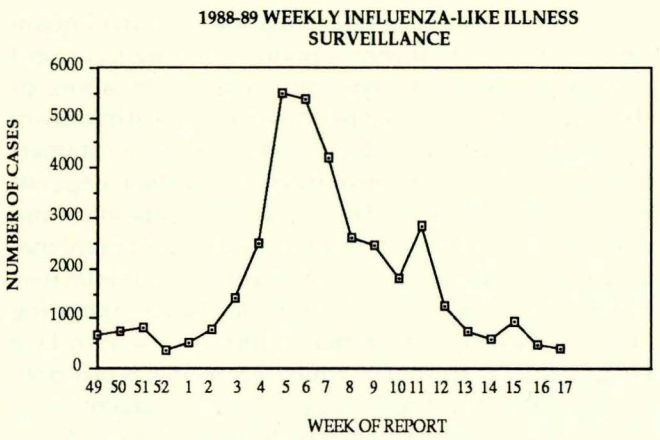
For management of infectious waste, a small-quantity generator has several options. On-site treatment may be by chemical, heat/pressure combination, or thermal degradation (incineration). Chemical treatment using either household bleach (chlorine) or a commercial histopathology fixative (formalin) is time dependent for exposure but is relatively simple, economical and effective. Treatment of infectious waste by a combination of heat and pressure, as in an autoclave, is effective, but generally requires more time for batch processing and is limited by the internal volume of the autoclave being used. Incineration, while acceptable, is probably not economically feasible for on-site management of infectious waste by small quantity generators. Additionally, on-site treatment only renders an infectious waste innocuous and the resulting solid waste must still be disposed in an acceptable manner. If the treated waste is deposited with the usual solid waste, a letter of certification, which includes a description of the treated waste, manner of treatment and signed by the responsible party, must be given to the solid waste management company that picks up the waste.

Off-site management of small quantity generator infectious waste may be accomplished by a number of options also. The small quantity generator may contract with a DNR licensed infectious waste management firm for disposal services. The generator is allowed by law to transport their infectious waste in their own vehicle and/or using their own employee to a DNR permitted disposal or treatment facility. A last option is to take the infectious waste to an accepting hospital that has already received permission from both DOH and DNR to handle off-site generated small-quantity infectious waste.

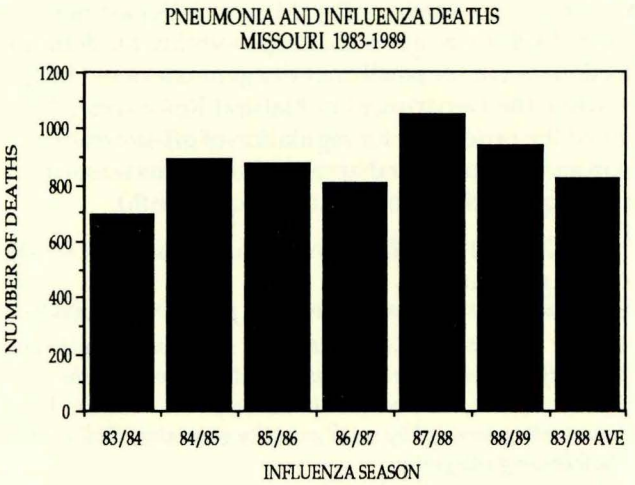
In summary, infectious waste poses the greatest risk to those who handle the material,the medical professionals who generate it or the waste hauler who disposes of it. Proper training and use of appropriate containment vessels will alleviate a majority of this risk. The law and regulations allow each small quantity generator to effectively manage infectious waste on- or off-site without excess cost and will minimize your professional liability. ■

1988-89 Influenza Season Summary

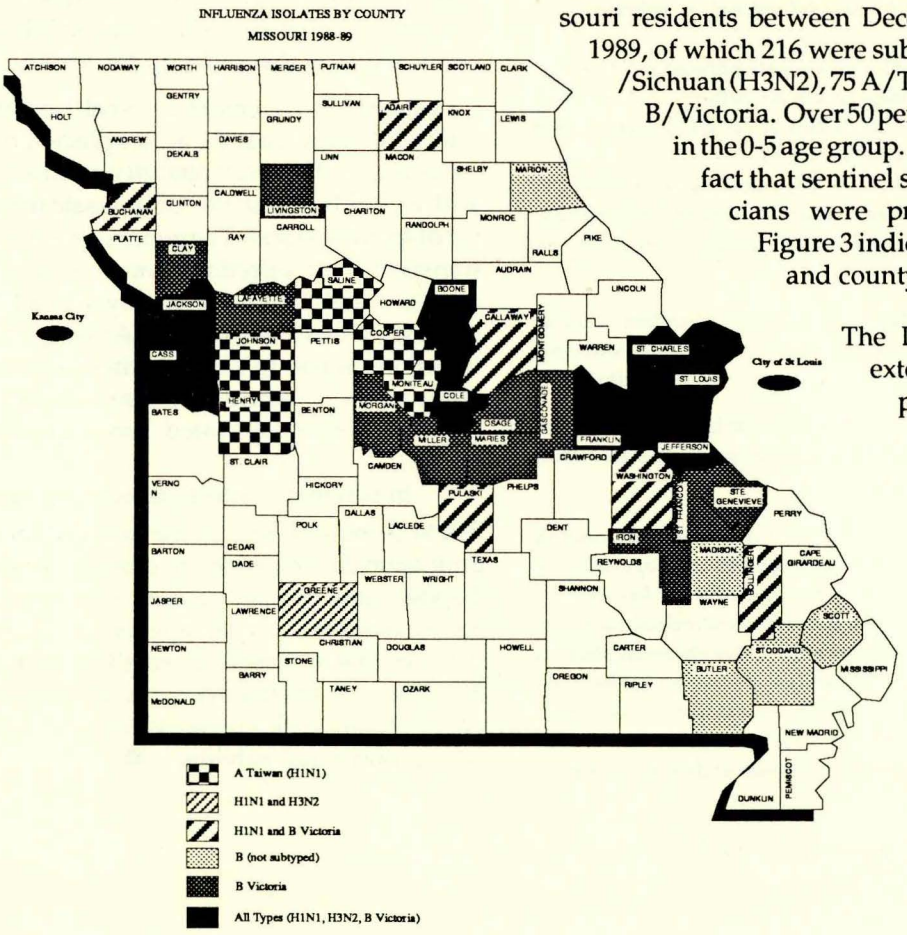
During the 1988-89 influenza season, over 36,975 cases of influenza-like illnesses were reported to the Department of Health. This is 3,244 more cases than the 1987-88 season. Figure 1 illustrates influenza-like illnesses reported during the past influenza season, by week of report.



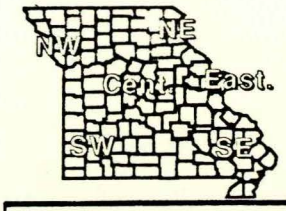
Typical influenza illness is characterized by abrupt onset of fever, sore throat, nonproductive cough, and extreme malaise lasting several days. The elderly and persons with underlying health problems are more susceptible to complications of influenza infection, including primary viral pneumonia resulting from invasion of the lungs by the influenza virus or secondary bacterial pneumonia. Figure 2 illustrates pneumonia and influenza (P&I) deaths for a six year period. As indicated, cases ranged from a low of 698 in 1983-84 to a high of 1,052 in 1987-88.



A total of 346 influenza isolates were reported in Missouri residents between December 1988 and April 1989, of which 216 were subtyped as follows: 21 A/Sichuan (H3N2), 75 A/Taiwan (H1N1), and 120 B/Victoria. Over 50 percent of all isolates were in the 0-5 age group. This is attributed to the fact that sentinel site participating physicians were primarily pediatricians. Figure 3 indicates isolates by district and county.



The Department of Health extends its gratitude to all physicians who participated in this year's influenza laboratory surveillance project. ■



Missouri Department of Health
Disease Prevention - Communicable Disease Control

BIMONTHLY MORBIDITY REPORT

Reporting Period *
March & April ,19 89

	Districts							KANSAS CITY	ST. LOUIS CITY	ST. LOUIS CO.	SPGFLD GREENE CO.	2 MONTH STATE TOTALS		CUMULATIVE		
	** NW	NE	CD	SE	** SW	** ED	*** OTHER					1989	1988	FOR 1989	FOR 1988	5 YR MEDIAN
Vaccine Preventable Dis.																
Chickenpox	336	428	321	731	227	385		0	0	318	1	2747	4020	5219	6366	
Diphtheria	0	0	0	0	0	0		0	0	0	0	0	0	0	0	
Influenza	17	6	48	1	3	4		23	1	0	3	105	40	243	77	
Measles	16	0	0	2	0	0		0	0	20	0	38	0	236	0	
Mumps	6	0	2	0	1	0		1	0	0	0	10	12	37	22	
Pertussis	0	0	0	2	1	0		4	0	1	0	8	3	9	5	
Polio	0	0	0	0	0	0		0	0	0	0	0	0	0	0	
Rubella	0	0	0	1	0	0		0	0	0	0	1	0	2	0	
Tetanus	1	0	0	0	0	0		0	0	0	0	1	1	1	1	
Viral Hepatitis																
A	33	1	2	5	8	0		68	9	9	4	139	153	197	258	
B	17	0	16	15	5	4		51	13	21	7	151	139	210	200	
Non A - Non B	1	0	0	1	0	0		3	0	3	1	9	13	13	17	
Unspecified	0	0	0	1	0	0		0	0	0	0	1	6	2	6	
Meningitis																
Aseptic	2	0	0	0	1	0		3	0	1	0	8	11	19	15	
H. influenza	3	0	3	2	4	0		0	5	1	1	19	23	31	39	
Meningococcal	1	0	1	1	0	1		0	1	2	0	7	9	8	17	
Other																
Enteric Infections																
Campylobacter	5	0	8	6	10	6		3	4	4	15	61	58	101	81	
Salmonella	7	2	14	5	7	10		11	5	20	3	84	92	168	163	
Shigella	2	3	1	2	3	2		21	13	21	0	68	109	130	152	
Typhoid Fever	0	0	0	0	0	1		0	0	0	0	1	2	1	2	
Parasitic Infections																
Amebiasis	0	0	0	1	0	2		0	0	0	0	3	5	7	11	
Giardiasis	18	1	16	6	7	23		10	2	7	2	92	68	156	95	
Toxoplasmosis	0	0	0	0	0	0		0	0	0	0	0	5	0	5	
Sexually Transmitted Dis.																
AIDS	4	1	2	1	3	2	3	17	17	8	1	59	64	118	118	
Gonorrhea	108	21	79	66	29	11		986	1050	311	29	2690	2661	5504	4970	
Genital Herpes	40	8	34	16	25	17		121	82	61	11	415	359	757	704	
Nongonoc. urethritis	63	17	66	34	4	15		262	580	227	16	1284	1360	2139	2516	
Prim. & Sec. syphilis	1	0	0	2	0	0		12	4	1	1	21	25	47	38	
Tuberculosis																
Extrapulmonary	0	0	2	1	0	0	1	1	1	0	0	6	7	8	10	
Pulmonary	2	1	3	6	1	1	3	4	11	6	0	38	51	54	73	
Zoonotic																
Animal Bites	194	27	60	109	69	63		1		226	1	750	982	1354	1049	
Psittacosis	0	0	0	0	0	0		0	0	0	0	0	0	0	0	
Rabies (Animal)	0	0	1	12	0	0		0	0	1	0	14	4	17	5	
Rocky Mtn. Sp. Fever	0	0	0	0	0	0		0	0	0	0	0	3	0	3	
Tularemia	0	0	1	0	0	0		1	0	0	0	2	5	3	10	

Low Frequency Diseases

Anthrax
Botulism
Brucellosis
Chancroid
Cholera
Cryptosporidiosis
Encephalitis (infectious)
Encephalitis (viral/arbo-viral)
Granuloma Inguinale
Kawasaki Disease
Legionellosis - 1
Leptospirosis
Lymphogranuloma Venereum
Malaria - 3
Plague
Rabies (human)
Reye's Syndrome
Toxic Shock Syndrome - 3
Trichinosis

Outbreaks

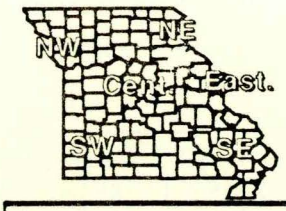
Foodborne/Waterborne
Histoplasmosis
Nosocomial - 5
Pediculosis
Scabies
Other

*Reporting Period Beginning FEBRUARY 26, Ending APRIL 29.

**Totals do not include KC, SLC, SLCo, or Springfield

***State and Federal Institutions

Due to data editing, totals may change.



Missouri Department of Health
Disease Prevention - Communicable Disease Control

BIMONTHLY MORBIDITY REPORT

Reporting Period *
May & June , 19 89

	Districts							KANSAS CITY	ST. LOUIS CITY	ST. LOUIS CO.	SPGFLD GREENE CO.	2 MONTH STATE TOTALS		CUMULATIVE		
	** NW	NE	CD	SE	** SW	** ED	*** OTHER					FOR 1989	FOR 1988	FOR 1989	FOR 1988	5 YR MEDIAN
Vaccine Preventable Dis.																
Chickenpox	229	145	102	413	133	149		1	0	274	2	1448	638	6667	7004	
Diphtheria	0	0	0	0	0	0		0	0	0	0	0	0	0	0	
Influenza	1	0	0	0	0	1		0	0	0	0	2	9	245	86	
Measles	0	0	0	0	1	0		0	0	0	0	1	0	237	0	
Mumps	1	1	5	1	0	0		1	0	0	0	9	8	46	30	
Pertussis	0	0	2	0	1	0		2	0	0	0	5	1	14	6	
Polio	0	0	0	0	0	0		0	0	0	0	0	0	0	0	
Rubella	1	0	0	0	0	0		0	0	0	0	1	0	3	0	
Tetanus	0	0	0	0	0	0		0	0	0	0	0	0	1	1	
Viral Hepatitis																
A	69	0	1	2	2	2		33	6	5	3	123	119	320	376	
B	23	1	29	4	7	7		12	11	8	12	117	101	327	300	
Non A - Non B	1	0	1	0	0	1		4	0	0	0	7	11	20	28	
Unspecified	0	0	0	0	1	0		0	0	0	0	1	2	3	8	
Meningitis																
Aseptic	3	0	0	1	2	4		1	0	1	0	12	13	31	28	
H. influenza	3	0	3	2	1	3		1	2	3	1	19	30	50	67	
Meningococcal	6	0	0	2	0	1		2	0	0	0	11	6	19	23	
Other																
Enteric Infections																
Campylobacter	7	1	14	3	15	2		7	8	25	6	88	92	189	173	
Salmonella	17	0	22	7	28	3		7	9	13	0	106	84	274	241	
Shigella	15	1	2	2	2	6		26	16	6	0	76	112	206	265	
Typhoid Fever	0	0	0	0	0	0		0	0	0	0	0	0	1	2	
Parasitic Infections																
Amebiasis	0	0	0	0	0	0		0	0	1	0	1	2	8	13	
Giardiasis	15	7	17	11	6	1		6	0	4	0	67	91	223	184	
Toxoplasmosis	0	0	0	0	0	0		1	0	0	0	1	1	1	6	
Sexually Transmitted Dis.																
AIDS	2	0	3	2	2	1	0	5	14	9	3	41	87	159	205	
Gonorrhea	85	17	72	83	22	21		1295	1249	498	25	3367	2364	8871	7334	
Genital Herpes	69	7	41	10	16	7		31	152	51	9	393	309	1150	1013	
Nongonoc. urethritis	32	2	7	24	3	14		242	503	346	13	1186	1186	3325	3702	
Prim. & Sec. syphilis	0	0	0	1	2	0		11	2	1	3	20	23	67	61	
Tuberculosis																
Extrapulmonary	1	0	3	0	1	0	1	1	0	2	1	10	7	18	17	
Pulmonary	1	0	8	5	7	4	5	7	1	5	0	43	42	97	115	
Zoonotic																
Animal Bites	76	35	42	128	61	58		17	0	156	1	574	773	1928	1822	
Psittacosis	0	0	1	0	0	0		0	0	0	0	1	1	1	1	
Rabies (Animal)	0	0	0	7	0	0		0	0	0	0	7	3	32	9	
Rocky Mtn. Sp. Fever	2	1	5	4	11	1		6	0	0	0	30	17	30	19	
Tularemia	0	0	1	2	4	1		0	0	0	0	8	14	11	23	

Low Frequency Diseases

Anthrax
Botulism
Brucellosis
Chancroid
Cholera
Cryptosporidiosis
Encephalitis (infectious)
Encephalitis (viral/arbo-viral)
Granuloma Inguinale
Kawasaki Disease - 3
Legionellosis - 5
Leptospirosis
Lymphogranuloma Venereum
Malaria
Plague
Rabies (human)
Reye's Syndrome
Toxic Shock Syndrome
Trichinosis

Outbreaks

Foodborne/Waterborne - 6
Histoplasmosis
Nosocomial - 2
Pediculosis
Scabies
Other

*Reporting Period Beginning MAY 1, Ending JUNE 30.

**Totals do not include KC, SLC, SLCo, or Springfield

***State and Federal Institutions

Due to data editing, totals may change.

Missouri EPIDEMIOLOGIST

Volume XI, Number 3 *July-August 1989*

School Health in Missouri: Meeting the Demand

Patti Van Tuinen, M.Ed., C.H.E.S., Bureau of Health Promotion

The need to educate our youth on how to maintain and improve their health has never been more urgent. School-age youth are the only age group for whom illness and death rates have increased rather than decreased over the past 20 years. In Missouri, the three leading causes of death in young people between the ages of 14 and 24 are alcohol-related auto accidents, homicide, and suicide. Approximately 48% of our 7th graders have already used alcohol or other drugs. National studies estimate that at least one-third and perhaps as many as 60% of our school students have at least one behavioral risk factor for heart disease (i.e. high fat diet, physical inactivity, smoking), our state's leading cause of death.

Over the past two decades our knowledge of the behavioral antecedents of disease and our ability to alter these behaviors early in life have increased dramatically. Yet to date we have failed to implement effective school health programs that exploit these advantages. A study of the 1990 Health Objectives for the Nation revealed that over one-third of the 227 health status goals could be directly attained or influenced by schools. Unfortunately, we are not going to accomplish many of these objectives by 1990.

Many of the health problems facing students today are both interrelated and preventable. Well planned and administered comprehensive school health programs can address immediate health and safety concerns, as well as give students the information they need for improved health throughout their lives. National studies have documented the efficacy of comprehensive school health programs to increase students' health knowledge, create a healthful environment conducive to learning, and enhance positive health attitudes and behaviors of students, their families and teachers.

The Centers for Disease Control and the American School Health Association are now advocating that we broaden our perspective of what encompasses a quality comprehensive school health program. If well coordinated, the following eight components can have complementary and synergistic effects on the health of school students. These components are:

- School health services
- School health instruction
- A healthful, safe environment
- Physical education
- School food services
- School counseling
- Wellness programs for school employees
- Integrated school and community health promotion efforts

In recent years, state commitment to comprehensive school health education has increased considerably. The Department of Elementary and Secondary Education has developed health instruction guidelines and established eight regional resource centers to assist schools develop health curricula. However, the state does not mandate a health course for students prior to graduation. For the most part, classroom teachers in Missouri

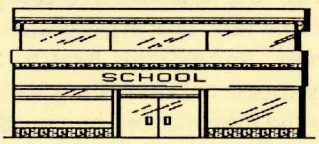
Inside this Issue...

receive little, if any, academic training to teach health. And many schools lack current, educationally sound health education resource materials.

In response to our state's need to strengthen school health, the state legislature passed Senate Bill 202 in 1987 to establish the Coordinating Council for Health Education of Missouri's Children & Adolescents. This council's mission is to promote the coordination of health education services to improve the health status of Missouri youth. Council members are directors of the state departments of Elementary & Secondary Education, Health, Mental Health, Social Services, and Public Safety, state legislators, and parent, teacher, adolescent, higher education, physician, public health and juvenile justice leaders. The Bureau of Health Promotion of the Missouri Department of Health provides staff support for this council.

During the past year the council consulted state and national school health leaders, surveyed public and private schools, held public forums, and visited model health education programs. They adopted the eight point comprehensive school health model as the basis and direction for its work. The council's final report of statewide recommendations and strategies to improve school health will be issued in early 1990.

Schools can possibly do more than any single agency in our society to help young people live healthier, productive lives. But they cannot do it alone. They need the collaboration and support of medical professionals, community agencies, and public health departments. It is encouraging to know that more health professionals are becoming involved in working with schools to protect and improve the health of students, their families, and school personnel.



To effectively promote and protect the health of school age youth in Missouri, the following must be achieved:

1) A long term commitment to quality comprehensive school health must continue to be a priority of the Missouri Department of Elementary & Secondary Education, the Missouri Department of Health, and local schools, communities, universities, public health departments, and medical professionals.

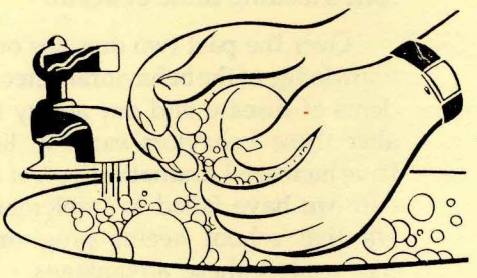
2) The expanded comprehensive school health model, which incorporates the eight components previously discussed, must be adopted across the state.

3) A broad base of local and state funds, services, and educational resources must be available to support school health programs.

Articles in this issue describe some of DOH's efforts to support the health services, health instruction, and healthful environment components of comprehensive school health programs. ■

Dirty Hands Spread DISEASE

WASH THEM!



MISSOURI DEPARTMENT OF HEALTH

Erwin Gadd, Chief, Bureau of Community Sanitation

Have you noticed this placard in the school restroom? It carries one of the easiest, simplest and most inexpensive public health messages, yet it is extremely important to the health of school teachers and student body. Proper handwashing techniques should be a part of every school's education efforts.

The message to wash hands after toilet, before eating and preparing food is based on the fact that disease-causing germs do not have a means of moving from place to place, such as feet or wings, but must depend on other means. These objects, called "fomites" are transmitted on "dirty hands." An adequate supply of soap and paper towels should be available in restrooms. Cloth towels should be avoided.

Hands are probably the most common vehicle for the transmission of contamination to food and food-contact surfaces. Hands become soiled with a variety of contaminants while at work and play. Handwashing, particularly after using toilet and before eating, develops a routine that will become part of the lifestyle and encourage a sense of cleanliness and self-respect. ■

Wash those hands — Don't be guilty of spreading disease!

HEAD LICE: *Pediculus humanus capitis*

Irene Donelon, Bureau of Communicable Diseases

In recent years infestation with *Pediculus humanus capitis* has assumed epidemic proportions in some regions of the United States, particularly among school children. Except for the common cold, head lice infestation affects more school-age children than all other childhood communicable diseases combined. As can be seen by the following table, there has been an overwhelming increase in reported cases of pediculosis in Missouri over the past five years.

Pediculosis - Missouri

Year	Cases Reported
1984	2,377
1985	2,622
1986	5,830
1987	10,567
1988	9,799

Pediculus humanus capitis is one of three species of lice which infest man. The other two species are *P. humanus corporis*, the body louse; and *Phthirus pubis*, the pubic, or crab louse. The head louse is a blood-sucking insect parasite found on the hair near the surface of the scalp, especially behind the ears and at the nape of the neck. Head lice are very small, approximately one to two millimeters long, and vary in color depending on the complexion of the human host; they appear darker on a host with dark skin and hair, and lighter on a host with light skin and hair. Their six legs, equipped with hook-like claws and opposing digits, enable them to grasp the hair shaft.

The lifespan of a head louse is believed to be about one month. During her lifetime a female will deposit three to four eggs a day. Live eggs, called nits, are grayish-white, oval and firmly attached to the hair shaft close to the scalp by a cement-like substance. Eggs take about one week to hatch, and the emerging nymphs mature in eight to nine days.

Both nymphs and adult lice feed on human blood. The skin is penetrated by the louse's mouth parts and saliva is poured in to prevent the blood from clotting. Itching, which is the major symptom of louse infestation, is caused by an inflammatory reaction to the saliva. Secondary infections may occur as a result of the scratching.

Transmission

Head lice are transmitted through direct contact with an infested person or indirectly via contact with infested garments, combs, and bedding. Studies suggest that person-to-person spread probably occurs more frequently than transmission by fomites. The reason is that head lice require the warm moist environment of the scalp and a frequent blood meal. Lice which leave the host will die within 48 to 55 hours. Pediculosis is not indicative of uncleanliness and occurs in all socioeconomic groups. Race, however, is a significant factor with the prevalence of infestation being 35 times higher in whites and other races than in blacks.

Diagnosis

Diagnosis of pediculosis is made by observing lice or nits on the hair and scalp. While identification may be made with the naked eye, a flash light and a magnifying glass may be helpful. Care must be taken to differentiate between nits, hair casts, dandruff, globules of hair spray, and empty nit cases. Empty nit cases are usually flattened, dull yellow, and papery.

Treatment

Infested persons and their personal articles such as caps, combs, brushes, towels, and bedding should be deloused. There are several preparations on the market which will effectively eradicate head lice. Some require a prescription while others may be purchased over the counter. A creme rinse preparation containing permethrin, is now available by prescription and usually requires only one application, since residual activity on the hairs is effective in killing any lice that hatch from still viable eggs. Since most shampoo preparations currently available do not have re-

Pediculicides Available in the United States

	Brand Name	Lice Killing Time	Application Time*	Ovicidal Activity
Permethrin**	Nix	10-15 min.	10 min.	70-80%
Pyrethrins	A200, RID, R&C	10-23 min.	10 min.	70-80%
Lindane**	Kwell, Scabene	140-230 min.	4 min.	45-70%

* Manufacturer recommended

** Prescription required

NOTE: Use of trade names is for identification purposes only and does not constitute endorsement by DOH.

sidual activity, a second application is required 7 to 10 days after the first (lindane and pyrethrins). This is intended to eliminate lice that hatch after the first application of shampoo.

Whatever method is used, the Missouri Department of Health (DOH) urges complete and thorough removal of nits with a specially designed nit comb. DOH believes that nit removal is essential in preventing reinfestation and is recommended even if product marketing information deems nit removal unnecessary. Thorough, complete nit removal is the only way to insure reinfestation does not occur.

As noted in the table, lindane offers no advantage in pediculicidal or ovicidal activity compared to permethrin or the over-the-counter pyrethrin preparations. Lindane also has the longest killing time and the least effective ovicidal activity. Since 1983 the National Pediculosis Association has maintained that the potential toxicity of lindane outweighs any possible benefits it offers as a pediculicide and that the safer, more effective treatment alternatives listed are available to the consumer.

Using hot water (130°F or 55°C) and detergent, machine-wash all washable clothing and bed linens that have been in contact with the infested person. Drying clothing for 20 minutes at a high heat setting will also destroy nits. Dry cleaning will kill lice and nits. Combs and brushes should be soaked for one hour in a 2% Lysol solution or placed in hot water (150°F) for 5 to 10 minutes. Be aware that some articles may be damaged by heat.

Fumigation or spraying of schools and homes is not recommended because of the short lifespan of lice away from the human host. Also, eggs present on detached hairs will not hatch at room temperatures of 70°F or less. There is no evidence available which indicates that use of environmental insecticides brings an outbreak of head lice under control faster than not using them.

Control

When a case is reported in a school, close contacts such as classmates and friends should be examined for evidence of infestation. The DOH's recommendations for the control of pediculosis in schools include:

- ✔ Students found to have evidence of infestation (lice or nits) should be excluded from school attendance until a pediculicide has been applied and all nits have been removed.
- ✔ The student should be examined upon returning to school to ensure all nits have been removed.
- ✔ The student should be reexamined in 10 days to determine if he/she remains free of infestation.

As long as all nits have been removed, a child may return to school the morning after treatment.

During an outbreak in a school, classroom activities involving frequent body contact between students, such as dancing, wrestling, certain games and groups activities, should be suspended. To reduce transmission via fomites, hats should be kept in pockets or sleeves; resting mats and pillows should be permanently assigned and kept separated when not in use; hooks, spaced at least 12 inches apart, should be assigned in cloakrooms.

Family members should be inspected and treated only if they are infested. However, bedmates should be treated prophylactically. Bed linens and clothing which have been in contact with the infested person should be washed or dry-cleaned. Home disinfestation may be accomplished by thoroughly vacuuming the mattress, carpets, upholstered furniture, and car upholstery. Again, spraying or fumigation is not advised.

Each school year an inordinate amount of time and effort is expended by school officials, public health officials, and parents dealing with the ongoing problem of pediculosis. Parents must also assume the financial burden of treating and sometimes retreating their children. When schools have an administrative "no nit" policy in place, it makes the nurse's task more realistic and less subjective. It gives the nurse a strategy for returning lice control responsibility to the parents. The end result is an environment of mutual assurance — the nurse is confident that parents are doing everything possible and the parents are assured that their child re-enters a school that supports the most comprehensive program possible.

In light of these factors, DOH strongly recommends that schools adopt a "no nit" policy to reduce and control the occurrence of pediculosis. The department recommends this "no nit" policy even though product information and other authoritative sources may not.

Bibliography is available by contactig the Bureau of Communicable Diseases, 800/392-0272. ■

Heat Exhaustion In the Classroom

Diane C Rackers, Section of Disease Prevention

Heat exhaustion is due primarily to the unbalanced or inadequate replacement of water and salts lost in perspiration due to thermal stress. Heat exhaustion typically occurs after several days of high temperature. Symptoms include normal or slightly elevated body temperature; pale, clammy skin; profuse perspiration; tiredness and weakness; headache; dizziness and nausea, sometimes with cramps or vomiting. Fainting may occur.

Humans are, to a large extent, capable of adjusting to the heat. This adjustment, under normal circumstances, will take about a week, during which time the body undergoes a series of changes that make heat exposure more endurable. Students returning to a classroom without air conditioning in late summer or early fall after spending a summer vacation in cooler climates or in air conditioned homes may need time to make this adjustment.

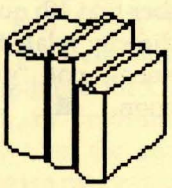
Perspiration and increased skin blood flow are the normal ways the skin handles much of the body's heat-dissipating chores. As environmental temperatures approach normal skin temperature, the job of cooling the body becomes more difficult. Blood brought to the body surface cannot shed its heat if air temperatures are as warm or warmer than the skin. The difficulty worsens when the humidity is high. The student's ability to perform tasks may also be affected by the hot environment.

If air conditioning is not available, windows in classrooms should be opened and all available fans should be turned on to encourage air flow. Students should be encouraged to dress appropriately. Clothing made of thin cotton fabric allows perspiration to evaporate by picking it up and bringing it to the surface. Loosely fitting garments are also advantageous. Closely fitting garments and synthetic fabrics interfere with evaporation. Students should also be encouraged to increase fluid intake. As much as 50% more fluid than the amount dictated by thirst may be needed to replace increased water lost through perspiration.

The opening of school also includes an increase in athletic activities for some students. Students should be encouraged to prepare for athletic activities by a general conditioning program carried out in a warm or hot environment allowing gradual acclimatization to the heat. Practice sessions should be held early in the morning or late in the evening, lightweight uniforms should be worn, adequate rest periods should be allowed and adequate water should be readily available at all times. Weight loss in athletes should be observed carefully. Heat exhaustion is most likely to occur in the early days of training before the athletes are acclimatized.

References:

1. NIOSH, Hot Environments, July 1980.
2. USPHS Region VII, Prevention of Heat Related Illnesses, June 1982.
3. CDC, Background Information on Heat-Related Health Effects and Recommendations for the Prevention of Heat-Related Injury, June 23, 1988. ■



STD Teaching Aids Available to Missouri Schools

Raymond L. Bly, Chief, Bureau of Sexually Transmitted Diseases

The Bureau of Sexually Transmitted Diseases has worked closely with the Department of Elementary and Secondary Education (DESE) to periodically update segments of the health curriculum guide which relate to sexually transmitted diseases (STD). The bureau also performed a school survey in cooperation with DESE to determine the number of public, private and parochial junior and senior high schools currently teaching about STD. The survey also asked for the number of schools which would agree to utilize instructor and student manuals entitled *STD: A Guide to Today's Young Adults*. These manuals are provided without charge in classroom sets of 30 for students and three for instructors for each school requesting them. At present, 617 junior and senior high schools out of 1,255 have requested and received these manuals. When school begins this year, mailings will continue and manuals will be made available to all additional schools upon request.

In addition to the STD teaching manuals, a variety of STD pamphlets are available to schools in quantity without charge. Audio visual resources including 16 mm films and one half inch video cassettes are available for short term loan without charge. Requests should be sent to the Bureau of Sexually Transmitted Diseases, 1730 E. Elm, Jefferson City, MO 65101. ■

Sports-Related Heat Illness

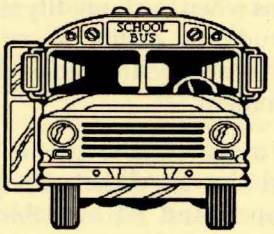
Patrick E. Phillips, D.V.M., M.S.P.H., Consultant Epidemiologist

When August rolls around in Missouri, there are two things that can be expected: 1) HOT weather; and 2) fall sports (football, soccer, etc.) practice. As we have learned in recent years, severe environmental heat can be a life-threatening situation; when strenuous physical activity by teenagers is added to the equation, the condition becomes one loaded with dangerous consequences.

Young people have a higher metabolic rate than adults and hence, produce more body heat per unit mass. With physical exercise, even more body heat is produced and it is not unusual for core temperature to rise into the 102-105° F range. In addition to the above, males normally have a 10 percent higher metabolic rate than females. Lastly, as body temperature rises, the thermostatic center in the hypothalamus becomes less able to regulate body temperature leading directly to malignant hyperpyrexia and ultimately, death.

Body heat is dissipated in three ways: radiation, evaporation, and conduction. While up to 60 percent of excess body heat can be lost through radiant energy, this effect is negated by clothing that warms up and holds the heat close to the body. Evaporation can account for up to 35 percent of the excess heat shed by the body, assuming low relative humidity and adequate fluid intake. Conduction is not of practical importance in the loss of excess heat.

Evaporative cooling of the body is the best method for protecting against heat illnesses, but many



factors impact its effectiveness. The body begins secreting sweat automatically when its temperature passes 98° F. Usually this sweat evaporates quickly and correspondingly, cools the body; when relative humidity reaches 50 percent, the rate of evaporation begins to decrease significantly. Above 80 percent humidity, evaporation is minimal and therefore of less consequence in the heat-loss process. Another factor in evaporative cooling is wind chill; the result of wind blowing across the body is the same at 20° F as at 80° F, i.e., increasingly more heat lost as the wind velocity increases.

Control of the effect of environmental heat is an important factor in evaporative cooling. Not adding additional heat from the environment to the normal body heat resulting from exercise increases the effectiveness of sweating.

Summary

There are a number of practices that can be employed to prevent heat illness casualties in sports:

1. Wear light-colored clothing to reduce the amount of heat absorbed by the body from direct sunlight;
2. Schedule practices during cooler parts of the day, i.e., early morning, late afternoon, or evenings;
3. Utilize shade, fans and frequent breaks to avoid excess heat build-up;
4. Provide cool (50°F) water treated with salt at the rate of one teaspoon per gallon free choice to replenish body fluids lost through sweating.
5. Acclimatization to environmental heat beginning three weeks before the start of practices (the body can produce three to four times more sweat in a given time period after acclimatization than before).

Finally, remember that 4th quarter endurance is directly related to cardiovascular fitness, not "gut" exercises at high noon. ■

1988-89 School Immunization Audit

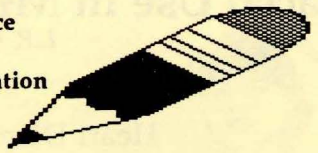
Lawrence F. Nahlik, Bureau of Immunization

State law requires school children to be immunized against four communicable diseases: diphtheria, polio, measles and rubella. In addition, tetanus and pertussis may be included in the vaccine administered. While it is the responsibility of the Department of Health (DOH) to enforce this law, protecting Missouri children from childhood diseases depends on the efforts of school nurses and administrators in carrying out the provisions of the law.

The Bureau of Immunization audits school immunization records for several reasons. The audit visit allows DOH Immunization Program representatives to meet school nurses face-to-face to discuss current policies and recommendations for the vaccine-preventable diseases. Periodic audits also serve to verify the accuracy of annual reports submitted by the schools.

Audits of immunization records of randomly selected schools were completed in May by immunization bureau field staff for the 1988-89 school year. Standardized audit

"Recent outbreaks indicate the need for continued diligence on the part of school nurses, school administrators, and immunization program staff in monitoring the immunization levels of Missouri school children."



criteria and procedures for compiling records were applied uniformly in all districts. This year, 69,121 records were reviewed. Results of the audits for required immunizations were compiled, and records of students found not to be in compliance were analyzed to identify the reasons for their non-compliance. The statewide difference between the audit findings and the immunization levels reported by the schools remains small, as shown.

Adequately Immunized For	Audit Findings (%)	School Reported Average (%)
Diphtheria	96.8	97.6
Polio	97.4	98.2
Measles	97.2	98.4
Rubella	97.2	98.5

Findings of the audit are shown below*:

	ADEQUATELY IMMUNIZED	EXEMPT	IN NON-COMPLIANCE
Diphtheria	96.8%	1.1%	2.0%
Polio	97.4%	1.0%	1.5%
Measles	97.2%	0.8%	1.2%
Rubella	97.2%	0.8%	1.1%

N = 69,121

*Percentages do not total 100 because immunizations in progress and measles and rubella immunizations given between 12 and 15 months of age to children born in 1982 or later are not included in these data.

Of the students found to be in non-compliance, a majority (61.5%) were non-compliant for DTP/Td, and nearly half (47.5%) were out of compliance for OPV. Lack of immunizations after the age of three is a major reason for non-compliance for both of these immunizations. Missing or inadequate dates represent an important reason for non-compliance. This deficiency is the most important reason for measles and rubella non-compliance, and it is among the three most important reasons for non-compliance for all four immunizations.

Reason for Non-Compliance

	DTP/Td	OPV	Me	Ru
Health record missing	8.8	11.7	14.6	14.7
None after age 3	33.8	54.5	N/A	N/A
No 10 year booster	33.9	N/A	N/A	N/A
Dates missing or inadequate	19.4	26.4	57.4	58.2
Inadequate exemption	1.2	1.7	1.6	1.8
Too few immunizations	2.4	4.6	N/A	N/A
Before first birthday	N/A	N/A	23.9	22.9
Other	0.5	1.0	2.6	2.3
Total	100	100	100	100
% of all in non-compliance**	61.5	47.5	36.3	35.3

Total in non-compliance = 2,227

**Total is greater than 100% because students may be non-compliant in more than one immunization.

Recent outbreaks indicate the need for continued diligence on the part of school nurses, school administrators, and immunization program staff in monitoring the immunization levels of Missouri school children. The figures above show problem areas to which our attention must be directed. Consistent screening of students entering kindergarten helps to decrease the number of children lacking immunizations after the age of three. Similarly, screening entering tenth graders will protect high-schoolers from tetanus by alerting them of the need for ten-year Td boosters. Finally, the data illustrate the importance of clear, consistent record-keeping for parents and health care providers. ■

Tobacco Use in Missouri's Youth: A Preventable Addiction

L.R. Cooperstock, M.P.H., Cancer Control Coordinator

Heart Disease is the leading Cause of death in Missouri.

Cancer is the second leading cause of death in Missouri.

Smoking plays a major role in these diseases.

Ninety percent of current smokers began before the age of 19.

These above statements are a natural lead-in to the discussion of the most preventable cause of disease and death: **TOBACCO.** We must make sure Missouri's youth are the target of an intense campaign of education and prevention. Schools and primary care physicians can be a major source of information and guidance in preventing children from starting to use tobacco.

The Problem

A recent survey conducted by the Missouri Department of Health and the University of Missouri Psychology Department, indicated that in the 12th grade population 31% of females and 27% of males had smoked during the previous week. Among 12th grade males, 37% used some form of tobacco (i.e. cigarettes or smokeless tobacco) in the past seven days.

It is estimated that at least 12 million people used smokeless tobacco in the United States in 1985.* Use is increasing, especially among male adolescents and young male adults. Concerted efforts to prevent the initiation of tobacco use are needed.

The influence of tobacco in our society can also be seen in the following ways:

- ✔ Days of work lost due to illness is higher for smokers.
- ✔ Tobacco significantly increases the years of life lost statistic for the United States.
- ✔ Infants who live in smoking households suffer more respiratory illness and ear infections.
- ✔ Smoking during pregnancy is a significant cause of low birth weight and infant mortality.

The addicting process of nicotine is similar to that of other drugs such as heroin and cocaine. Smoking and smokeless tobacco use are addictive behaviors. Experimentation and adoption of the habit usually occur during adolescence; therefore, prevention programs should focus on this group. Many children and adolescents who are currently using tobacco, state that they do not intend to use tobacco in later years. This attests to the sad fact that they are unaware of or underestimate the addictive nature of nicotine.

Tobacco Use in Women

Due to the increased number of women smoking, death caused by lung cancer has surpassed death caused by breast cancer. Women have finally become equal to men in the incidence of lung cancer.

In order to replace smokers that quit or die, the tobacco industry must reach a new source of smokers. Selected segments of the market - especially young women - appear to offer an excellent opportunity for growth.

The fact that more adolescent females than males smoke is evidence that the strategy is working. More than 2,000 young women begin smoking every day in the United States.

Tobacco advertising is increasingly addressing the younger female. Millions of dollars spent to promote cigarettes in magazines are read by young women, i.e. Cosmopolitan, Vogue, Mademoiselle, Ms.

Action Plan

The Cancer Control Advisory Board, appointed by the Missouri Department of Health, specified tobacco use reduction as a high priority cancer control activity. Youth are identified as a key target population. The Missouri Cancer Control Plan outlines recommended activities for various providers to enhance cancer control in their settings.

Traditional as well as non-traditional health information providers (schools, mass media, community organizations, worksites, legislators, and others) are addressed in the Cancer Control Plan. The schools and school-related professionals are asked to provide health education to students, establish cancer control resource collections in school libraries, and implement tobacco use prevention programs.

Programs and materials are available from a number of sources including the voluntary health agencies and state and local health departments. A comprehensive listing of materials, programs, and

* *Public Health Service. The health consequences of using smokeless tobacco.*

sources has been compiled and published as the Cancer Control Resource Directory. The Plan also suggests collaboration between schools and other providers in order to make more effective use of cancer control resources.

Many of the Cancer Control Plan objectives deal with tobacco use prevention and cessation. The schools can have a significant influence on young students in developing healthy life styles and preventing tobacco use. School tobacco use prevention programs have proven to be effective in reducing the onset of tobacco use, especially when such programs begin in the lower grades. In one study, students receiving training in tobacco use prevention began smoking at a rate of 3.4% per year and students not receiving training began smoking at a rate of 8.4% per year. School based programs can also reach the family via parent-teacher and parent-school interactions.

The Cancer Control Plan specifically addresses elementary and secondary schools, the Department of Elementary and Secondary Education, Parent Teacher Association, School Related Professional Associations, and Teacher Education and School Administration Programs. Additional objectives for these groups include a) reducing exposure to tobacco among faculty and students; b) enhancing resources and programs; and c) encouraging participation in cancer early detection.

Missouri Does Not:

- **prohibit use or possession of tobacco by minors**
- **prohibit the sale of tobacco products to minors**
- **prohibit free distribution of tobacco to minors**
- **prohibit cigarette vending machines accessible to minors**
- **require signs posted at point of sale stating no sale to minors**
- **provide for license revocation for sale to minors**

Source: 1989 Report of the Surgeon General, U.S. Dept. of Health and Human Services.

The last objective suggested for all provider groups is the protection of health of Missouri's youth through enactment of cancer control legislation. Much of the public isn't aware that Missouri has no law prohibiting sale to minors, and such a law would be unenforceable as long as cigarettes are sold in vending machines.

School-related organizations and primary care professionals should encourage Missouri State Legislators to enact laws that would make it more difficult for children and adolescents to acquire tobacco. It should be a priority for educators to convince the legislators to implement a school cancer prevention program. Contacts with Missouri law-makers can be made on an individual level from constituents, and as an organizational activity. ■

Note: Copies of the Missouri Cancer Control Plan and Cancer Control Resource Directory are available from the Bureau of Smoking, Tobacco, and Cancer, 201 Bus. Loop 70 W., Columbia, MO 65203.

Medical Epidemiologist Joins DOH

Todd F. Baumgartner, M.D., M.P.H., has joined the state department of health, effective July 17, 1989 as medical epidemiologist in the Division of Environmental Health and Epidemiology. His primary responsibilities will include medical and epidemiologic consultations within the Bureau of AIDS Prevention. In addition, he will be involved in consultation on various projects within the division related to the investigation of clusters of disease potentially due to environmental exposure.

Dr. Baumgartner recently completed medical residency in General Preventive Medicine/Public Health with the California Department of Health Services. This included, most recently, experience in field epidemiology and public health practice with the San Joaquin County Public Health Department. Following completion of his medical degree from the University of Missouri-Columbia, Dr. Baumgartner completed a year of medical residency in the Department of Family and Community Medicine at the University. He received his Masters in Public Health in Epidemiology from the University of California-Berkeley in 1988.

A sports enthusiast, Dr. Baumgartner enjoys participating both as an avid Missouri and St. Louis fan and as an amateur athlete. He will be living in Columbia with his wife, a medical resident at the University of Missouri-Columbia Hospital. ■

Lead in School Drinking Water

Richard H. Gnaedinger, Ph.D., Bureau of Environmental Epidemiology

The health effects of lead contamination have received much national attention over the past two decades, and the state of Missouri has received its share of attention on this subject as a result of the hazards surrounding the lead-mining industry in the well-known lead belt area of the state. The hazards of lead in paint and in leaded gasoline are also well recognized, but Missouri is not unique in this respect.

The most recent lead contamination issue that has received so much attention in the last two to three years is the problem of lead in the schools' drinking water. Investigations by the Environmental Protection Agency (EPA) and others have found higher levels of lead in drinking water at the point of use than was found at the water processing plant. This suggested that lead was leaching into the water in the distribution system, from such things as piping, soldering materials and water coolers, and indeed this was this case.

In view of this discovery, the Lead Contamination Control Act (LCCA) was enacted by Congress in 1988. Its purpose was to address the problem of lead contamination in schools because the consumption of lead by children can be very dangerous and exposure to lead can cause serious damage to the brain and central nervous system, kidneys, and liver. Children are particularly sensitive because their bodies are developing and as a result they absorb and retain more lead than adults. Even at very low levels of lead exposure, children can experience reduced I.Q. levels, impaired learning and language skills, loss of hearing, reduced attention spans, and poor classroom performance.

The LCCA directed the EPA to publish a guidance document to assist schools in discovering the levels of contamination in plumbing and in drinking water coolers and in taking actions to reduce the contamination. All schools have received information on how to order this guidance document.

The LCCA also encourages states to participate in assisting the schools and local educational agencies in identifying and correcting their lead contamination problems. States are supposed to provide a list of laboratories that are qualified to test water for lead, and states may establish and use additional programs to compliment the EPA guidance documents.

Cooperatively with the Department of Elementary and Secondary Education and the Department of Natural Resources, the Department of Health has been providing information to schools on: (1) the unsafe drinking water coolers as identified by the EPA, (2) qualified, testing laboratories, (3) cooler flushing methods, (4) industry and government contacts regarding the lead contamination problem, and (5) on other options for dealing with their identified problems to reduce the risk to the students.

For additional information contact the Bureau of Environmental Epidemiology, 800/392-7245. ■

CDC Alert...

Severe Group A Streptococcal Infections

The Centers for Disease Control (CDC) has recently become aware of several small clusters of patients in the United States with severe, systemic, and sometimes fatal infections due to group A Streptococcus (GAS). These infections often have occurred among previously healthy adults. CDC has been in communication with health officials in Sweden, Denmark, and Norway who describe recent increases in severe infections, bacteremia and mortality due predominantly to one serotype of GAS, again, often among previously healthy adults.

Some of these patients have had unusual manifestations including desquamating erythematous rashes and disseminated intravascular coagulation. A recent article (Stevens, DL, et al. Severe group A streptococcal infections associated with a toxic shock-like syndrome and scarlet fever toxin A. N Engl J Med. 1989; 321:1-7) describes a series of patients in the Rocky Mountain region with severe GAS infections manifested by a toxic shock-like syndrome. To date, no cases of severe GAS infection have been reported in Missouri. CDC has requested assistance in conducting surveillance, extending through June 1990, to identify:

1. **Clusters of patients with GAS bacteremia or severe GAS infections manifested by any of the following: shock (including toxic shock); extensive tissue injury; desquamating rash; disseminated intravascular coagulation; renal failure; acute respiratory distress syndrome; death.**

AND

2. **Sporadic cases of GAS bacteremia or severe GAS infections occurring among otherwise healthy individuals.**

Use the Missouri Disease Case Report (CD-1) to report. All GAS isolates should be sent to the State Health Laboratory where they will be saved for further studies at CDC. This approach will help determine the incidence and distribution of these infections and to characterize the etiologic GAS strains. **For more information, contact the Bureau of Communicable Diseases, 800/392-0272.** ■

AIDS and the School Nurse

Dee Finley, Health Educator, Bureau of AIDS Prevention

Policy

The landmark AIDS legislation enacted by the 84th General Assembly and signed into law by Gov. John Ashcroft spoke to public school policy. Section 191.689, RSMo (House Bills Nos. 1151 & 1044) gives incentive for Missouri's schools to have an AIDS policy in place. The law stipulates that the policy should be consistent with recommendations of the Centers for Disease Control, and it prevents the state health department from reporting the names of HIV-infected school children to schools that do not have such a policy in place. The Department of Elementary and Secondary Education (DESE), with the Department of Health (DOH), has revised the Missouri Public Schools Policy Guidance on Communicable Disease, and will be mailing it, along with a number of helpful publications, to all Missouri public and private schools this fall.

The policy guidance from DESE and DOH contains all of the essential provisions of the Centers for Disease Control. These policy guidelines are available through the Bureau of AIDS Prevention or the Department of Elementary and Secondary Education.

These guidelines should be reviewed by all schools due to the continuous improvement in HIV and AIDS treatment and the expansion and redefinition of employee and student civil rights. The latest information has been incorporated into the revised policy guidance. It is important, and recommended by DOH, that school nurses be involved in any policy revision or policy adoption process.

Infection Control

School nurses are important contributors to the policy-making process because they understand the basics of infection control, the cornerstone principle of the CDC's guidelines—universal precautions. School nurses have been aware of universal precautions with regard to prevention of infection from communicable diseases for a number of years. These precautions have not changed because of the onset of AIDS. Common sense precautionary measures for cleaning blood and/or body fluids are recommended, and have always been recommended to reduce the risk of a number of communicable diseases.

"School policy, infection control and educational material are three aspects of the AIDS issue that should dominate the concerns of school nurses."

Educational Material

In addition to asserting themselves in the policy forming process, school nurses should stay current on available teaching aids. Several forms of AIDS educational materials are available from the Bureau of AIDS Prevention for school-age audiences. There are a number of informative pamphlets that are designed for students. "Playing It Safe: Teenagers and AIDS" is a colorful pamphlet that discusses issues that concern teenagers. The Red Cross has several informational pamphlets that answer questions for parents, students and school systems.

Audiovisuals are an effective way to begin a discussion with students, parents and coworkers. There are a number of videos available that are suited to each of these audiences. "What is AIDS" is designed to reach elementary-aged children by using persons in costumes to explain the AIDS virus and how it works. "AIDS Taking Action" is one of many videos available for Junior High students. "Letter from Brian" and "Don't Forget Sherrie" are effective videos, reaching both rural and urban young adults. Videos are also available for parents and teachers. "AIDS: What Do We Tell the Children" and "Talking with Teens" are informative videos that advocate the importance of teaching children and teens at home and in school. A resource guide listing all available videos, pamphlets and posters is available from the Bureau of AIDS Prevention, 314/751-6438.

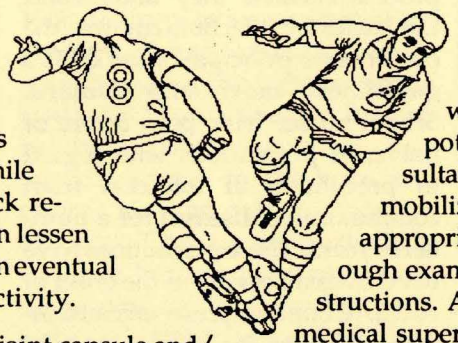
"AIDS: What Young Adults Should Know," is a model curriculum available in all school districts. The curriculum contains both student and instructional manuals. An interactive computer program was designed to complement the curriculum and is available for use with IBM and Apple computers. The student and instructional manuals are in each school district office. The computer program can be obtained, free of charge, from the Bureau of AIDS Prevention.

School nurses are an integral part of a school system that provides education and understanding to all those involved in the AIDS epidemic. ■

Sprains, Strains and Broken Bones in Athletics

Patrick E. Phillips, D.V.M., M.S.P.H., Consultant Epidemiologist
Pat A. Forbis, A.T.C., A.T.R., Jefferson City Bone & Joint Clinic, Inc.

Any physical activity carries with it some risk of injury. The most common ailments associated with sports are joint sprains, muscle and tendon strains and fracture of bones of the limbs. While not all injuries are preventable, quick response and appropriate treatment can lessen pain, promote healing and allow for an eventual return of the individual to a sports activity.



Sprains result from injury to the joint capsule and/or the ligaments holding the bones of the joint in apposition. The most common sites for sprains are: 1) ankle; 2) fingers; 3) knee; and 4) neck. Nearly 90 percent of sprains result from the application of force (impact) to the lateral aspect of the joint's plane of motion; the rest are due to hyper-extension of the joint. Immediate application of wet ice will help to reduce swelling and pain; periodic reapplication of ice over the next 48 hours is beneficial to recovery. During the night, ice should be applied for only 30 minutes at a time with one hour between applications. Healing of the injury will begin after the first 48 hours and can be promoted by the judicious use of heat applications and exercise. With the return of pain-free movement to the joint, external support via taping or wrapping should be used before any game or practice to help prevent re-injury.

Strains involve the tearing or even complete severance of muscles or tendons and is more serious in terms of dysfunction and time of recovery. The most common areas of injury are: 1) large muscle groups of legs and pelvis; 2) shoulder; and 3) spinal column. Strains occur due to either a passive or active overpowering in the opposite direction of the muscle contraction. Application of ice and compression with elastic bandages, where possible, is necessary to lessen the potential formation of hematoma and resultant scar tissue. Complete, relaxed immobilization of the involved muscle group is appropriate until a physician can make a thorough examination and provide more specific instructions. Applications of heat and exercise, under medical supervision, will hasten recovery but complete return of flexibility and strength will take up to six months even with diligent exercise by the individual.

The occurrence of broken bones can be career-ending and are the most dangerous of athletic injuries. The most common fractures involve: 1) the long bones of the arm or leg; 2) the ribs; and 3) the bones comprising sliding joints (wrist and ankle). Of special concern is fracture of any bone of the spinal column; the affected person should not be moved (even to stretch out the legs) until examined by a physician and then moved only by trained personnel. While bones will usually repair in six to eight weeks, the atrophy of muscles and contraction of ligaments resulting from casting will call for many months of rehabilitation and re-conditioning to attain the previous level of performance.

In summary, athletic injuries can not be avoided due to the very nature of sports. Appropriate medical care with strict adherence by the athlete to the specific treatment regimen will hasten their return to sporting activity. Lastly, all injuries take time to heal and nothing yet known can allow for instantaneous recovery. ■

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Fifth Disease: Human Parvovirus B19 Infection

Irene Donelon, Bureau of Communicable Diseases
(Condensed from the MMWR Volume 38/No.6/February 17, 1989)

Human parvovirus B19 has been identified as the causative agent of erythema infectiosum (EI), also known as fifth disease. EI is the most commonly recognized illness associated with B19 infection and is characterized by a "slapped cheek" facial rash and a lacelike rash on the trunk and extremities which may produce itching. The rash may fade and reappear over a period of several weeks. Systemic symptoms are few and mild and generally occur one to four days before rash onset. The incubation period is usually four to fourteen days but can be as long as 20 days. Arthralgias and arthritis have been reported in some EI outbreaks. Inapparent infections are common.

Complications

Serious complications of human parvovirus B19 have been recently recognized, including transient aplastic crisis (TAC), chronic anemia, and fetal death. B19 can cause TAC in patients with chronic hemolytic anemia (i.e., sickle cell disease, hereditary spherocytosis) and in other conditions in which increased red cell production is necessary to maintain stable red cell indices. Patients with TAC may require hospitalization and transfusion. If not treated promptly, TAC can be fatal.

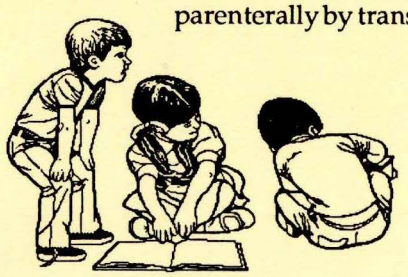
Persons with congenital or acquired immunodeficiency who are infected with B19 may develop severe chronic anemia associated with red cell aplasia.

While most B19 infections during pregnancy do not adversely affect the fetus, some cases have been associated with fetal death. Tissues positive for B19 DNA have been reported in 20 fetal deaths, 17 of which described pathologic findings including nonimmunologic hydrops fetalis. The precise pathogenesis of fetal death remains unclear. An ongoing study in the United States suggests that B19 attributable fetal deaths are infrequent. Estimates of the risk of fetal death after exposure of a woman whose antibody status is unknown, must take into account the rate of susceptibility in the population and the risk of infection after the exposure. By taking these factors into account, the ***upper limit*** estimate of the risk of fetal death would be <2.5% after exposure to household members with infection and <1.5% after prolonged exposure at schools with ***widespread*** EI among students. The upper limit risk estimate of fetal death after other types of exposure, such as schools with limited EI among students, is likely to be substantially less.

Because some of the animal parvoviruses are teratogens, there is a concern that B19 infection may also be associated with congenital anomalies in humans. There is, however, no evidence that the rate of congenital abnormalities following B19 infection exceeds background rate.

Transmission

B19 infection is most frequently recognized during outbreaks of EI in schools. Outbreaks usually occur in late winter or early spring, but can occur throughout the year. Studies suggest that respiratory secretions are involved in transmission and that the virus is transmitted effectively after close contact exposure. Persons with EI are probably not infectious by the time the rash appears. In contrast, persons with TAC are likely to be infectious during the course of their illness. In outbreak settings, it is not known whether the primary mode of transmission involves direct person-to-person contact, fomites, large-particle droplets, or small-particle droplets. The virus can also be transmitted parenterally by transfusion of blood or blood products and vertically from mother to fetus.



Prevention

Although B19 infection usually produces a mild, self-limited illness, there are three groups of persons at risk of serious complications:

- ✔ persons with chronic hemolytic anemia
- ✔ persons with congenital or acquired immunodeficiencies
- ✔ pregnant women

Since infection in these persons can lead to substantial morbidity and some mortality, consideration should be given to prevention. There is no vaccine available to prevent B19 infection and routine prophylaxis with immune globulin is not recommended at this time.

While most persons with EI are past their period of infectiousness when a diagnosis is made, there is risk for transmission of B19 from persons with TAC and from persons with chronic B19 infection. To prevent nosocomial infections, these persons should be considered infectious and placed on isolation precautions.

Options for preventing transmission of B19 infection are limited when outbreaks occur in situations in which prolonged, close contact exposures occur, such as in homes, schools, and day care centers. Since the greatest risk of transmitting the virus occurs before symptoms develop, transmission cannot be prevented by identifying and excluding persons with EI.

When outbreaks occur, parents of school-aged children and employees should be advised about the risk of transmitting and acquiring infection and about who is at risk for serious complications. The decision to try to decrease any person's risk of infection by avoiding a workplace or school environment in which an outbreak is occurring should be made by the person after discussion with fam-

ily members, health-care providers, public health officials, and employers or school officials. A policy to routinely exclude members of high-risk groups is ***NOT*** recommended.

Management of People Exposed to Parvovirus B19

The exposed individual with chronic hemolytic anemia should be managed by alerting the patient or the patient's parents or guardian regarding the signs and symptoms associated with TAC (pallor, weakness, and lethargy). A physician should be consulted immediately if signs or symptoms of TAC develop. Management of the patient with TAC is based on treating symptoms of the associated anemia and may require blood transfusion.

The exposed individual with congenital or acquired immunodeficiency should be managed by advising the patient or the patient's parents or guardian about the possibility that B19 infection may lead to chronic anemia.

In managing exposed pregnant women, risks should be considered in context of other risks to the pregnancy and the risks associated with intervention. For women with a documented B19 infection, maternal serum alfa-fetoprotein levels and diagnostic ultrasound examination have been used to identify adversely affected fetuses, but the sensitivity and specificity of these tests, their appropriate timing, and the risks and benefits of their use in managing infected pregnant women, have not been determined.

Diagnosis

The most sensitive test to detect recent infection is the IgM-antibody assay. B19 IgM antibody can be detected in approximately 90% of cases by the third day after symptoms of TAC or EI begin. The titer and percentage of positives begin to decline 30-60 days after onset. B19 IgG antibody is usually present by the seventh day of illness and persists for years. B19 antibody may not be detectable in immunodeficient patients with chronic B19 infection, and additional testing for B19 DNA or viral antigens may be necessary to document infection.

The inability to grow the virus in sufficient quantity to produce antigen for diagnostic assays has precluded widespread availability of B19 testing. At this time the Missouri State Public Health Laboratory does not provide B19 testing. The Division of Viral Diseases, Center for Infectious Diseases, Centers for Disease Control (CDC), can accept a limited number of specimens for B19 diagnostic testing. At this time, CDC is accepting specimens through state health departments from patients with TAC, immunodeficient patients with chronic anemia, pregnant women exposed to B19 or with symptoms suggestive of B19 infection, and cases of nonimmune fetal hydrops possibly related to B19 infection, and not accepting specimens for routine antibody testing. Physicians can arrange testing at CDC by consulting DOH at (800-392-0272). Pamphlets on Fifth Disease are available through your local or district health office. ■

Missouri EPIDEMIOLOGIST

Published by the
Missouri Department of Health
Division of Environmental Health
and Epidemiology Services
P.O. Box 570, 1730 E. Elm Street
Jefferson City, MO 65102-0570
Telephone: (314) 751-6080
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Sexually Transmitted Diseases
- Take Time Out to Get the Facts About Genital Herpes(pamphlet)
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- Professional educational materials for school nurses
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- Various bilingual materials regarding public health (native languages of Southeast Asia)

These materials may be ordered from your District Health Office or from Films and Literature. "A Soap Opera" is available for loan from:

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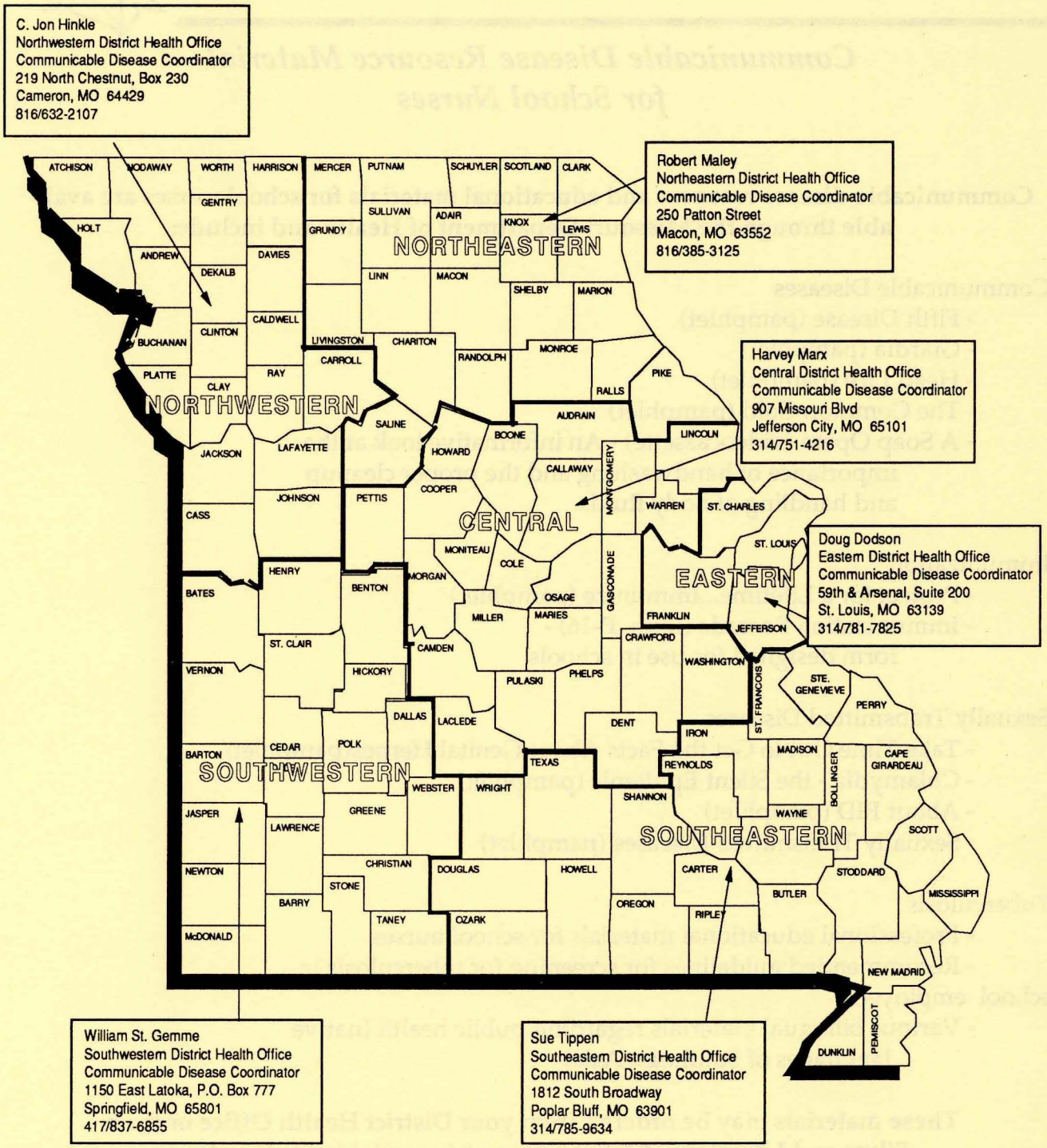

Missouri
EPIDEMIOLOGIST

Volume XI, Number 4 *September-October 1989*

Methicillin Resistant *Staphylococcus Aureus* Infections and Colonization

Mark D. Winton, M.D.
Infectious Disease Specialist

Introduction

Methicillin-resistant *Staphylococcus aureus* is a variant of a ubiquitous organism, *Staphylococcus aureus*. It has been recognized as a problem in our hospitals and nursing homes over the past ten years. It is misunderstood by many physicians and nurses, and may be unrecognized in many areas. This is because of its fastidious characteristics for production of the abnormal protein which sets it apart from the wild type strains.

History

In the 1940's, most strains of *Staphylococcus aureus* were susceptible to penicillin, but almost immediately after using this agent, some were found to contain an enzyme to break down penicillin. These few bacterial strains suddenly had a survival advantage, and by 1951 most of the hospital strains were resistant. With the advent of more stable penicillins, those which were impervious to the beta lactamases, a new group of organisms flourished, first noted in 1961 in Britain, but now worldwide. [1] These are the methicillin-resistant *Staphylococcus aureus* (MRSA).

Outbreaks were sporadic at first, but new strains were seen in Australia in the early 1970's which were not only methicillin-resistant but carried many resistance genes.[1] These are the organisms found today in almost all the hospitals and nursing homes in Missouri. From the early 1970's when only tertiary centers recognized the MRSA, it has spread and is recognized in the majority of community hospitals studied.[2] In 1984 it was found in over 85% of U.S. hospitals. [3]

Resistance

Resistance in *S. aureus* may be mediated by three main mechanisms. First, there may be production of an enzyme released into the milieu which can inactivate penicillins. This enzyme is known as a beta lactamase because it destroys the beta lactam ring of penicillins which is essential for antimicrobial activity. The gene for this enzyme may be carried on a plasmid and transported to other staphylococci. This was the initial wave of penicillin resistance seen in the 1940's. Most *S. aureus*, both in the hospital setting and in the community, have this enzyme.

Second, there may be intrinsic resistance. Penicillins work by binding to specific proteins (a penicillin-binding protein, or PBP) in the growing bacterial cell wall and cause this enzyme not to function. If the PBP is not available for penicillin binding and activity, penicillins have no effect on the bacterial cell. This type of resistance accounts for the methicillin resistant state with

Inside this Issue . . .

the bacterial chromosome carrying the modification for PBP.

Third, there is tolerance to penicillins. Beta lactam drugs such as penicillin act on actively growing bacterial cells. Tolerance occurs when the cells remain in a dormant state, not allowing the antimicrobial agents to exert their effects.

The most important mechanism here is intrinsic resistance. MRSA produces an abnormal penicillin binding protein called PBP2a or PBP2', which is carried on the bacterial chromosome. This abnormal binding protein is the binding site for other beta lactam drugs, such as cephalosporins, monobactams and penems. By its mechanism of action, this renders MRSA resistant to all penicillins and cephalosporins. MRSA, however, has all three types of resistance and, therefore, is not just resistant to methicillin, but to all the beta lactam antibiotics. It also carries various plasmids which code for a wide variety of resistance, including aminoglycosides, tetracyclines, chloramphenicol, clindamycin, erythromycin and quaternary ammonium compounds.

Laboratory Testing

Standard laboratory tests do not favor the expression of the PBP2a protein. It may be missed on routine tests, such as a disc diffusion technique or some of the automated testing procedures. It is best enhanced by culturing the bacteria in a high salt media (either 4% or 7.5% NaCl) and at lower temperature (35°C). Also, MRSA grows a little slower than the wild type bacteria. It requires culturing a full 24 hours before evaluation. Even more difficult, not every organism in the specimen produces the same amount of PBP2a, maybe only one out of ten thousand or one out of ten million bacteria will produce enough to be evident. If even one colony grows up to the oxacillin disk, then MRSA is present.[4]

The Clinical Situation

Patients are exposed to all sorts of antibiotics. Most of the patients with MRSA are colonized; only a few are infected. This makes a difference in the approach to management. Colonization describes the condition of people who carry the organism, but show no evidence of invasion. They are completely asymptomatic. They generally are found when they are cultured for other reasons and are found to harbor the organism, or are cultured as part of an outbreak investigation.

Infection is generally accompanied by fever, an elevated leukocyte count, evidence of tissue destruction and often purulent discharge or vesicles. With infection in the immunosuppressed patient, these signs may not be seen.

Epidemiology

Many individuals are colonized with *S. aureus* of the wild phenotype. Health care workers are more likely to be colonized, with up to 50% of physicians and up to 70% of nurses harboring such organisms.[5] MRSA is less likely to remain as a colonizer in health care workers and in the community as it has no survival advantage outside hospitals and nursing homes. It is often overgrown by wild type *S. aureus* in the community setting. In outbreaks, the overall MRSA colonization rate of health care workers is low, about 2-10%.[1]

By far the most common type of transmission is by transient carriage on the hands. So far there is no published data on transfer of MRSA by fomites, such as by blood pressure cuffs. There is also little evidence of the airborne route of transmission under normal circumstances. Cookson et al. postulated that airborne/aerosolization transmission resulting in nasal carriage occurred during close patient contact such as dressing changes and bedmaking.[10]

A risk factor with this bacterium is its association with the prolonged use of multiple antibiotics. Other risk factors include prolonged hospitalizations and the debilitated nature of the patients.[6]

Control Measures

Historically, eradication protocols have been used to eliminate colonization. Ward, et al. used a protocol where trimethoprim-sulfamethoxazole and rifampin were given in addition to bacitracin to the nares and daily hexachlorophene baths for five days. Cultures were taken on days 1, 3 and 5 after completion. If MRSA were still present, the protocol was repeated, and subsequent cultures obtained. This had the potential of lengthening the hospital stay by 21 days. Overall, the rate of eradication with this regimen was 60%[7]. It is doubtful this would be approved now in acute care facilities with the DRG's (Diagnosis Related Groups) in place.

In a 1988 study, ciprofloxacin was tried. Ciprofloxacin is a new antibacterial agent which has powerful Gram negative activity. It also has some Gram positive activity and works by a different mechanism than the beta lactam drugs. A regimen of 750 mg po BID for over seven days resulted in the eradication of the bacteria in 11 of 14 cases. Since this study, others have been published which show less efficacy, and overall the rate of eradication comes close to 70%. The trade off is that those organisms which persisted also became ciprofloxacin resistant.[8]

For these reasons, the current recommendation is to avoid antibiotics in the colonized patients, and to decolonize health care workers only in certain circumstances. One such circumstance is when a cluster of cases occurs, and there is a direct link of the same phage type of MRSA to a colonized staff member. Because only 2-10% of staff members are colonized with MRSA, sur-

veillance cultures of health care workers are not recommended unless an epidemic situation occurs.

Infected patients present other problems. Beta lactam drugs, including imipenem (Primaxin), are ineffective. Most other drugs are unreliable because of the resistance genes, and the only clinical alternative is vancomycin. This must be given by the intravenous route. When given orally it is not absorbed, and it is extremely painful when administered intramuscularly. At this time, no other antibiotics are as clinically effective as intravenous vancomycin.[1,4]

Because of the pharmacokinetics of vancomycin, it penetrates mucous membranes poorly. For this reason it is ineffective in eradicating the colonization of MRSA.

Clinical indicators will determine when to stop therapy in infected patients. Most will not require long term treatment with vancomycin. Those that do may still be able to receive antibiotic therapy in a long term care facility which can manage intravenous antibiotics and blood levels.

With vancomycin it is important to monitor serum levels, both peak and trough, and to follow serum creatinine. Vancomycin is excreted through the kidneys, and has the potential for nephrotoxicity and ototoxicity. Also, renal function declines with age and the potential for toxicity increases.[1]

New agents for the treatment of invasive MRSA infections are in development and use. Teichoplanin is a glycopeptide antibiotic compound related to vancomycin. It has utility in that it may be given intramuscularly and has a long half life. However, in bacteria which have become resistant to vancomycin, there has also been cross-resistance with teichoplanin.[1]

4-quinolones like ciprofloxacin are being developed with a better Gram positive spectrum, such as ofloxacin. In addition, there are other peptide antibiotics which affect cell wall synthesis at earlier points than the beta lactam drugs.[1]

A promising topical agent is under investigation for elimination of colonization. This is mupirocin (Bactroban) or pseudomonic acid. It has failed in some clinical trials when used as a single agent, but may have some use in the eradication protocol described by Ward[7] by substituting for bacitracin ointment. Of note, there has been reported resistance to this compound in clinical trials.[1]

In January 1989 the Commonwealth of Kentucky Department for Health Services published a set of guidelines for the control of MRSA.[9] The Missouri Department of Health concurs with these basic guidelines. This excellent document lists the compiled recommendations for control of MRSA in hospitals and nursing homes. It echoes the findings of numerous studies and experience in infection control measures.

Most institutions have found it necessary to cohort those patients both colonized and infected with MRSA, either in the same room or the same wing. This has been tried in various forms, from routine body substance isolation to strict isolation measures. Each institution has had different experiences and efficacy. The main recommendation has been for strict attention to handwashing before and after patient contact.

Decolonization of patients is not indicated in most situations for the reasons outlined above. Colonization of patients by MRSA is not an indication for admission to the hospital, nor is decolonization. Colonization with MRSA should not preclude nursing home admission.

Communication is vital between transferring facilities to inform each other of patients colonized with MRSA so that cohorting may be properly coordinated. Transfer agreements can then be formally made. When these methods are instituted it can be shown that the number of new cases of MRSA colonization or infection will be lower.

Summary

Most MRSA strains have plasmids which carry resistance factors to almost all antimicrobial agents in our armamentarium. Patients may become colonized with these bacteria and remain healthy. These individuals need no antibiotic therapy. There are those who acquire MRSA infections, and when they have invasive disease, they must be treated with IV vancomycin.

Laboratory sensitivity data is often inaccurate because of the variable expression of the enzymes involved. For all practical purposes, if a *S. aureus* isolate is resistant to oxacillin, methicillin or nafcillin, ignore the rest of the sensitivities and treat this as MRSA. Remember, it will be resistant *in vivo* to all beta lactam drugs; this includes the penicillins, cephalosporins, imipenem and aztreonam and combination drugs where one drug is a beta lactam, such as Timentin, Unasyn and Augmentin.

The best way we can deal with this problem is by education in how it is transmitted, and with practice of appropriate infection control measures. Transient hand carriage seems to be the most common method of spread. In conclusion, we must realize that MRSA is here to stay, that we will not eradicate it completely, but we can deal with it.

Dr. Winton practices internal medicine in Jefferson City and provides consultation to the Department of Health Nosocomial Infection Control Program.

Guide to Prevent Transfer of MRSA

1. Wash hands with antiseptic soap for at least 10 seconds between any contact with one patient and another, whether they are known to be colonized or not, and before leaving the room. Gloves are not an effective means by themselves to prevent transfer of the organism[11].

2. Use standard infection control measures such as body substance isolation: gloves for contact with moist surfaces on and around the patient, such as moist bedding, or any other potentially infectious site. Masks may be helpful when the patient has MRSA pneumonia.

3. Avoid antibiotics in as many patients as possible. This will lower the survival advantage of this bacteria.

4. Cohort patients with MRSA. Minimize contact between colonized persons and noncolonized persons. This will prevent transfer to a non-colonized person.

5. Maintain a high level of suspicion about MRSA. Most patients are colonized and are asymptomatic. The most likely candidates will be those who are catheterized, intubated, elderly or immunosuppressed in any way.

6. Do not overreact. This leads to rash and often harmful measures in terms of inappropriate antibiotics, random culturing, patient isolation and care, and to fear by family and staff members.

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Methicillin-Guidelines for the Control of MRSA Infections

Reprinted from Kentucky Department for Health Services

Hospital admission

— Distinction between colonization and infection to be determined by clinician.

— Treatment for MRSA infection to be undertaken in a hospital, unless an alternative setting offering adequate therapy and infection control precautions is available.

— MRSA colonization is not an indication for hospital admission.

— Cultures should be taken of high risk patients on admission; repeated culturing of patients, culturing of employees, and environmental culturing is generally not indicated.

Nursing home admission

— Adequate communication between facilities is vital.

— Nursing homes can generally admit patients who are colonized with MRSA.

Infection control procedures

— A minimum standard for handwashing and for precautions regarding wound and skin care must be observed for all patients.

— Cohorting of patients colonized or infected with MRSA is indicated, whether the facility is endemic for MRSA, experiencing sporadic cases, or experiencing an MRSA epidemic.

Treatment

— Decolonization recommended only under special circumstances.

— IV Vancomycin is the standard for treatment of MRSA infection.

— Protocols and dosages will be published separately by physicians.

Management of an MRSA epidemic

— Epidemic is three or more nosocomially acquired epidemiologically associated cases.

— Culturing of employees indicated only if epidemiologically implicated.

— Cohorting of MRSA positives is indicated.

— Epidemiologic investigation, written report, and notification of the local health department should be carried out. ■

Cohorting, Segregating and Use of Barrier Precautions for MRSA

Caryl Collier, R.N., B.S., C.I.C., Nurse Epidemiologist

The following applications are intended for hospitals or nursing homes.

Although three epidemiologically-linked MRSA cases/isolates may signal an outbreak on a general medical-surgical unit or in a nursing home, one MRSA case or isolate should be considered as an outbreak in high risk areas such as an intensive care unit (ICU), burn unit or newborn nursery. [1,2,10,11]

The approach to managing MRSA is determined by whether or not the facility has a relatively constant endemic level of MRSA isolates. If there is a constant level of endemicity, a facility should enforce an ongoing strict cohorting of patients and personnel and not attempt to decolonize personnel unless they are assigned to a different unit.

Contact isolation has been known to fail in controlling the transmission of MRSA primarily because of lack of compliance.[1] Diligent implementation of universal precautions for blood and body fluids has been effective in preventing outbreaks in one facility when monitoring of high risk admissions was a continuous process.[8] Strict cohorting plus the use of barrier precautions have been shown to be effective in some published reports [2,3,6-9]; cohorting is explained in detail.

Definitions:[2]

Cohort — two or more patients in a facility, physically separated from other patients, and cared for, as much as possible, by personnel who do not care for other patients

Segregation — the physical separation of a single patient from others in the facility, with care for that patient assigned to one staff member per shift (that staff member limiting care for other patients as much as practicable) (i.e., a "cohort" of one).

A. Cohorting (for most endemic or outbreak situations)

1. Designate one area of a facility for colonized or infected patients. The area should not have a lot of traffic. In a large facility, it may be necessary to designate several cohort areas.[3]
2. Cohort the colonized or infected patients in the designated area until two negative (non MRSA) cultures are obtained, one week apart.
3. Roommates of infected patients should be cultured nasally and from any potentially infected or colonized area such as the site of an invasive tube.[2,5] If the initial culture is negative, the infected patient's roommate should be removed from the room or the infected patient moved to the cohort area.
4. Assign the MRSA colonized personnel to the colonized or infected patients. Colonized personnel should not care for non-colonized or non-infected patients.[2-5] If it is absolutely necessary for personnel to go to other areas of the facility, particularly within an eight hour shift, strict handwashing technique is essential.
5. Handwashing must be stressed for visitors before leaving the room. Instructions on proper handwashing technique can be posted in the cohort room or a **STOP ALERT** sign on the door can alert visitors to request information at the nurses' station.
6. Equipment such as blood pressure cuffs and stethoscopes should not leave the cohort area. If it is possible to assign separate equipment, including blood pressure cuff and stethoscope, to each patient, this is preferable but not absolutely necessary. However, each patient should have a separate graduate for measuring urine or other drainage. These receptacles should be washed and disinfected daily. Note: MRSA has been isolated from fomites. Whether these micro-organisms are viable enough to cause colonization or disease after transfer to hands is an unanswered question.
7. Meals should be provided in the cohort area. Isolation dishes are unnecessary.

B. Alternative Management of Asymptomatic Colonized Patients in Non-Outbreak Situations: Nursing Homes, Psychiatric Units, and Similar Low Risk Areas.[7,8]

In endemic situations, where strict cohorting of certain patients is not practical and new cases have not developed for one month, selected colonized (asymptomatic and no MRSA active infection) patients may leave the cohort area. Any colonized MRSA patient must be bathed, have wounds or colonized invasive sites cleansed and covered, have hands washed and rinsed with alcohol and must have clean clothes on before leaving the room. Nasally colonized nursing home residents, if coherent and cooperative, should be instructed not to touch their noses. If they become symptomatic with sneezing, coughing and nasopharyngeal secretions, even though the etiology is an allergic response, they must remain in the cohort area.

Individual assessment should be done as to whether incoherent and uncooperative colonized residents should remain in the cohort area in the absence of an outbreak. This entails methods for preventing the colonized sites from contaminating the environment.

C. Barrier Precautions

1. Cover draining areas with dressings.
2. Use gloves when:
   - touching invasive tube sites colonized or infected with MRSA.
   - contact with any secretions/excretions whether or not MRSA colonized.
3. Use gloves and masks for:
   - all MRSA wound manipulations (cleansing, dressing changes, whirlpool baths)
   - bathing and bedmaking of patients with MRSA rash areas: pustules, vesicles, eczema, impetigo, psoriasis
   - close contact (bathing, bedmaking, suctioning) with patients having a MRSA <u>infected</u> respiratory tract (actively sneezing, coughing, expectorating sputum, naso-pharyngeal secretions)
   - cleaning a <u>colonized</u> tracheostomy site; suctioning or mouth care of a MRSA colonized respiratory tract.

Gloves and masks are unnecessary if just entering the room for brief visits or to give medications that are easily taken orally by the patient. However, handwashing must follow any contact with the environment.

A recent study by Cookson et al. St. Thomas Hospital, London, England, postulated that nasal MRSA carriage occurred in nurses because of inhaled MRSA particles during performance of dressing changes, wound manipulations, physiotherapy and bedmaking. The researchers suggest that transmission to patient followed transfer from the nose to the hands.[3] Most current literature suggests the reverse - that transmission follows hand to nose to hand transfer.[12] There is little research to document the exact mode of transient nasal acquisition.

4. Gowns are barriers when lifting or transferring patients with uncovered wounds, rash or skin colonization.
5. Gloves, masks, gowns and goggles should be worn if splashing of MRSA contaminated fluids is likely; e.g. suctioning, irrigating body cavities and hydrotherapy.
   - Although gloves are a must, masks, gowns and goggles may be indicated when emptying receptacles of MRSA contaminated drainage. Avoid aerosolization of fluid by slowly pouring the contents as close to the water level of the hopper as possible.
6. Strict handwashing with antiseptic soap for a minimum of 10 seconds friction; turn faucet off with a paper towel:
   - Before and after touching all invasive tubes on ***all*** patients.
   - After the removal of ***all*** gloves.
   - After contact with an MRSA colonized or infected patient, bed clothes, linens or environment.
   - Between touching different anatomical sites on same patient —one site infected, the other not.
7. An alcohol rinse, gel or foam can be used on the hands as an adjunct to handwashing, but not as a replacement for handwashing.
8. Keep hands away from the face while in the patient's room or clinical area.
9. Linen removal should be done with a minimum of agitation - use the roll up method or fold soiled side to soiled side. Place linen inside laundry bag and tie the bag in patient's room. It should not come in contact with the uniform nor be carried down the hall.
10. Dressings and other contaminated disposable items should be placed in trash bags and tied inside the patient's room. Dressings, chux, etc., should not be placed in uncovered trash containers.

D. Agents for Environmental Cleaning and Handwashing

Cleaning of environmental surfaces in the patients room, especially faucets, handrails, telephones and overbed tables, should be carried out twice daily. For routine environmental cleaning, any EPA registered disinfectant is effective against MRSA since it has been tested on standard cultures of *Staphylococcus aureus*. A facility may also choose to use a 1:100 chlorine solution by diluting household bleach, which contains approximately 5.25% free chlorine. A 1:100 dilution is made by mixing 10 ml of household bleach to one liter of water or 1.3 oz of bleach to one gallon of water. This dilution level is about 500 ppm of free chlorine or .05% free chlorine solution.

A liquid antiseptic soap is recommended for routine handwashing in the cohort area and during a facility wide outbreak.

The following information is available from the Nosocomial Infection Control Program, (800) 392-0272.

1. "Guidelines for the Control of Methicillin Resistant *Staphylococcus aureus* Infections," published by the Kentucky Department for Health Services and the Kentuckiana and Bluegrass Chapters of the Association for Practitioners in Infection Control. This is a 13 page booklet detailing a number of practical issues.
2. A decolonization protocol along with patient and personnel criteria for use.

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Chemical Residues in Food

John R. Crellin, Ph.D., Office of Epidemiology:
David Stull, R.S., Bureau of Community Sanitation

Introduction

One of the concerns often expressed about chemicals in foods is the presence of pesticide residues in food. The safe (allowable) amount of a registered pesticide in a food is called a tolerance. Acceptable levels of "banned pesticides" called "action levels".

Under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), the Environmental Protection Agency (EPA) is required to set tolerances for any pesticide being registered or reregistered which will be or is used on a food product or in animal feed.

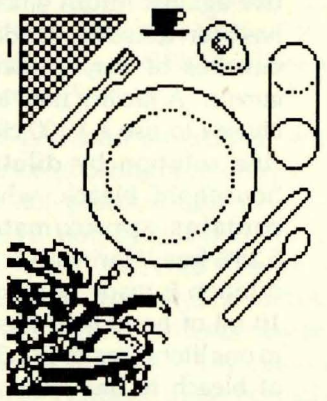
Many tolerances for pesticides are set under the Federal Food, Drug and Cosmetic Act (FFDCA), especially the "old" pesticides. "Old" pesticides are those manufactured before passage of FIFRA in 1973. While enforcement of this Act is chiefly the responsibility of the U.S. Food and Drug Administration (FDA), EPA is required to set tolerances for pesticides.

For pesticides, there are two types of tolerances; those set under section 408 and those under 409 of the FFDCA. Section 408 requires tolerances for pesticides used on raw products. Section 409 requires a tolerance for a pesticide in finished products if processing concentrates the pesticide. Section 406 of FFDCA requires action levels for the "banned pesticide" residues in food and feed commodities.

How Tolerance Levels Are Set

Establishment of tolerances by EPA is a modified risk assessment process. The first step is to determine the acceptable daily intake (ADI) for the pesticide. This is intake from all sources.

The next step is to determine the residues left on a product after legal application. These residue figures are used along with data on average consumption of the product to calculate the estimated daily intake (EDI) of the pesticide for a specific product. All estimated daily intakes from the different food sources for a pesticide are added together and compared to the acceptable daily intakes. If the total estimated daily



intake is more than the acceptable daily intake, then one or more uses have to be dropped until the estimated daily intake is equal to or less than the acceptable daily intake.

This process can be illustrated with a quick example. Actellic is an organophosphate which can be used as a fumigant on corn and kiwi fruit. The legal application of this pesticide on corn and kiwi fruit results in an estimated daily intake which is 89% of the acceptable daily intake. Actellic is not legal for use on wheat for domestic sale because the addition of actellic residues on wheat pushes the estimated daily intake to 136% of the acceptable daily intake.

The Delaney Paradox

Tolerance setting is a fairly logical and reasonable process with the exception of the Delaney Clause. The Delaney Clause is often misinterpreted as the no carcinogens in food law.

The Delaney Clause is part of Section 409 of FFDCA. It requires that tolerances not be set (i.e. none of the chemical can be in the food) if a chemical is an animal or human carcinogen. Because section 409 covers only pesticides (and other additives) which are concentrated in the finished product as compared to the raw, the Delaney Clause directly covers only 20% of food consumed in U.S.

The National Academy of Science (NAS) recently released a study of pesticides in food called the *Delaney Paradox*. They estimated that 45% of dietary exposure to carcinogens comes from unprocessed meat, milk, poultry, fruit, and vegetables. Twenty percent of dietary exposure is estimated to come from processed foods and 35% from the raw forms of the processed foods. Strict application of the Delaney clause would eliminate 55% of the risk from carcinogens in the diet, because it is EPA's policy to deny tolerances for raw forms (section 408) of products not given tolerances under section 409.

The National Academy of Science examined three other alternatives for regulating carcinogenic residues other than strict enforcement of the Delaney Clause. One alternative was the extension of the Delaney Clause to all foods. Strict enforcement would result in total elimination of any exposure to carcinogens in the diet. Another option would permit residues of carcinogens which translate into an excess cancer risk of 1 in a million (10^{-6}). This would reduce exposure 98%.

The last option would revoke all tolerances for a crop if the total residues on the raw and finished products exceeded a risk level of 1 in a million (10^{-6}). This would reduce exposure only 35%.

The National Academy of Science has concluded that permitting residues on all foods that do not exceed a 10^{-6} excess risk of cancer would significantly reduce current exposure while allowing the continued use of many pesticides. EPA has indicated that it will implement this option. This has stimulated strong opposition from environmental groups. The Association of State and Territorial Health Officials (ASTHO) and its Environmental Committee supports the EPA in their action.

Checking Foods for Pesticide Residues

While EPA is responsible for setting tolerances and action levels for pesticides, FDA checks foods for pesticides and takes whatever enforcement action is required. Levels of pesticides that exceed the action levels are found in about 2 - 4% of food analyzed.

However, concern has been expressed whether this number represents the actual occurrence of pesticide residues on food. FDA's surveillance is limited to about 14,500 samples per year: 8,000 of imported foods and 6,500 of domestic foods. Analysis is done for about 200 pesticides which represents only 40% of the pesticides that could be on food. An example of this is the ethylene bisdithiocarbamates (EDBC), a group of fungicides, used on about 1/3 of the fruits and vegetables in the U.S.

FDA's surveillance for pesticides is specifically designed to evaluate the exposure to pesticides in food on nationwide basis. However, the sample numbers are not large enough to detect excess dietary exposures in a particular state or in groups with dietary patterns different than national averages.

Presently, the Missouri Department of Health does not routinely monitor for pesticide residues in foods. However, state and local environmental sanitarians insure that additional pesticide contamination is not occurring as they conduct their routine inspection of food facilities. Included in these facilities are food service establishments, retail food stores and food processing and storage facilities.

Part of the sanitation inspection of any food handling facility requires the sanitarian to evaluate pesticide usage, storage and application. Violations caused by using pesticides that are unapproved for food plants or improperly applied or stored are considered major public health violations. These violations can result in permit suspensions or immediate corrective action through product embargoes or disposal of the pesticide and contaminated food products.

In conclusion, the current level of pesticide monitoring leaves many sources unchecked, although present regulations provide standards that would provide an acceptable level of protection. For more information on pesticide residues in food, please contact the ***Bureau of Community Sanitation, P.O. Box 570, Jefferson City, MO 65102, 314/ 751-6090.*** ■

Changes in the Reporting of Communicable Diseases

Additions/changes made to the list of reportable diseases, Sections 1 and 2 of 19 CSR 20-20.020 effective September 28, 1989 include:

- ***Lyme disease*** was added to the Category II diseases because cases have been diagnosed in Missouri. There were 36 suspected cases of Lyme disease reported in Missouri in 1988, including four which meet the current diagnostic criteria for definite Lyme disease. Required reporting of these infections will assist in determining the true incidence and geographic distribution of these infections in Missouri.
- ***Invasive Haemophilus influenzae disease other than meningitis*** is being added to the Category I diseases because control measures are the same as those for Hemophilus influenzae meningitis.
- ***Hepatitis A*** is being moved to the list of Category I diseases because prompt reporting is necessary to implement control measures effectively.
- ***Acute rheumatic fever*** is being added to the Category II diseases because of the recent nationwide increase in reports of this disease.
- ***Erythema infectiosum*** (fifth disease) outbreaks are being added to the Category II diseases because fetal deaths have been reported in outbreak situations.
- ***Scarlet fever*** (scarlatina) is being added to the Category II diseases. Aggregate data only is requested and will serve as a sentinel indicator for Group A Streptococcal activity.

-The encephalitis categories are being changed to conform to CDC's categories and thereby coordinate reporting efforts. They remain Category II diseases and are to be reported as ***encephalitis, post infectious and encephalitis, primary.***

-***Chickenpox*** remains a Category II disease, however, aggregate data only is being requested since specific identifying information is not necessary for surveillance purposes. ■

Chlordane Serum Health Study

John R. Crellin, Ph.D., Office of Epidemiology

Introduction

The Missouri Departments of Health, and Conservation, and St. Louis University are investigating exposure to the pesticide, chlordane, in individuals consuming fish contaminated with this chemical. This study was initiated because large numbers of Missourians are probably eating contaminated fish. Nothing is known about the levels of chlordane that result from ingesting contaminated fish and what, if any, health effects could result. The study is being funded by a grant from the Agency for Toxic Substances and Disease Registry, which is part of the U.S. Public Health Service.

It is estimated that over 200,000 Missourians are currently consuming fish contaminated with above 300 parts per billion (ppb) of chlordane. This estimate is based on monitoring of fish and annual surveys of fishermen by the Department of Conservation.

Twenty-eight areas, including large sections of the Mississippi and Missouri Rivers, are on Department of Health advisories to either limit or cease consumption of fish. Channel catfish or carp are listed on 27 of the 28 advisories and represent the vast majority of contaminated fish consumed. These two species are utilized in sports and commercial fishing.

Like the other cyclodines, chlordane's acute health effects in humans are related primarily to the central nervous system. Chronic health effects in humans have not been documented, but long-term feeding studies of rats, mice, and dogs have demonstrated liver and kidney damage. EPA has classified chlordane as a B-2 carcinogen based on three mouse and one rat study. The average river fisherman eating fish contaminated at 300 ppb has a maximum additional risk of cancer of 2 in 100,000, if he or she eat those fish for their whole life. The average Missourian has a 3 in 10 lifetime chance of cancer from all other causes.

Description of Study

We are studying three groups of people, two heavily exposed and one lightly exposed. These groups will be compared to a control population. Each group will contain 65 individuals over the age of 18 who consume one or more pounds of

channel catfish and/or carp per week for at least ten of the last 12 weeks.

Group I will be selected from sports fishermen and their families obtaining their fish from the lower 22 miles of the Meramec River. Studies conducted by the Missouri Department of Conservation in 1985-1987 found that 31 of 34 samples from seven species taken from the lower Meramec River were contaminated with chlordane above 300 ppb.

Group II will be commercial fishermen and individuals who purchase their fish from commercial fishermen. The commercially caught fish will come from areas of the Mississippi and Missouri Rivers under an advisory to restrict or eliminate consumption.

Group III will be made up of those who consume fish exclusively from areas where the chlordane levels in channel catfish and carp are below 150 ppb.

The control group will be persons 12-74 years of age from the Second National Health and Examination Survey (NHANES II), conducted 1976-80.

Participants in the study will be identified using names provided by the Department of Conservation from their lists of sports or commerical fishermen. Additional names will be obtained from Department of Conservation agents, and sports and commerical fishermen for the areas under study.

Study participants will be asked questions on the standard demographic parameters, fish consumption and preparation, and other exposures to chlordane. They will have about 45 ml of blood drawn, which will be analyzed for chlordane, DDT, heptachlor, other organochlorines, polychlorinated biphenyls (PCB's), and/or their metabolites. The detection limits for the organochlorines will be 0.1 to 0.5 ppb and for the PCB's 0.5 to 2.5 ppb.

Data generated from the questionnaire and serum analysis for organochlorines and PCB's were analyzed using descriptive and multiple regression techniques. Some of the variables might include: amount of fish consumed, method of preparation, area fish obtained from, number of years of consuming fish, and other potential predictors of organochlorine and PCB levels.

Participants and their physicians will be given copies of the laboratory results along with an interpretation. Medical consultants will be made available both to aid participants' physicians and to provide advice to individuals without a personal physician.

Each participant will also be given information about the known risks of consuming fish from the areas of concern. They will also be informed of the benefits of eating fish and encouraged to continue to consume fish at the same or greater amounts, while utilizing less contaminated fish. The study should take 12-18 months to complete.

Possible Benefits of Study

If a relationship between chlordane levels in fish and blood serum levels is identified, it would provide better evidence on the actual health risk from eating contaminated fish and permit more accurate health advisories. This study could also provide data on whether the method of cleaning and cooking may reduce the actual amount of chemical consumed. Studies of this factor have been inconclusive.

For More Information

If you would like to find out more about this study, please contact Dr. John R. Crellin at (314) 751-6079. ■

The Role of Physicians in Schools

Nela Beetam, R.N.C., School Nurse Consultant

EDITOR"S NOTE:

The "Back to School" issue of the newsletter was well-received by the medical community as well as school health nurses. Any portion of the newsletter may be reproduced; however, it would be appreciated if you would include a credit line to the authors and newsletter.

The private physician plays an important part in school health and in a community; the following article will address their role as we keep Missouri's school children healthy and in school.

Local, regional and state school health initiatives are most effective when implemented by a broad-based school health advisory council. One of the most desirable members of that advisory council would be a person to represent the medical community. The physician's expertise in areas such as growth and development, sensory deficits, behavior, learning disabilities and communicable disease is critical in the development and review of school health education, health services and school environment.

A second role for the physician is to serve in a consultative position, either employed by the district or on a voluntary basis. With the exception of those located in metropolitan areas, most school districts would find it difficult to budget for a school physician. In general, it is not a time-consuming task, but it does increase the safety for the student while giving credibility to school health policies. The Missouri Nursing Practice Act requires nurses to perform certain functions such as administering medications and treatments under the direction of a physician. Many school nurses could increase the level of health services provided to the district's students if there was a physician to review and approve standing orders and protocols for school health services. Many situations could be managed in the school setting more effectively and efficiently if the nurse had this professional collaboration available through a formal agreement.

A third role is advocacy. The American Academy of Pediatrics, in their publication ***School Health: A guide for Health Professionals,*** states "in order to be relevant, school health programs must reflect local needs. Local volunteers, who may be pediatricians or other physicians...must be willing to expend time and effort to take on an advocacy role." Physicians are aware of the physical and mental health needs of the children and families they see in their daily practice. Comprehensive school health policies and programs will be a vehicle for positive change in society. The physician would provide professional expertise and clout on behalf of those needs at local school board meetings. Missouri's children and youth need all the advocacy we can muster. ■

1989 Heat Surveillance Summar y— Missouri

H. Denny Donnell, Jr., M.D., M.P.H., Manager
Section of Disease Prevention

Compared to 1988, the summer of 1989 was very mild. Heat indices were lower than those experienced in 1988. During 1988, all areas of the state had brief peaks of heat indices late in June and broader peaks in early July followed by steadily rising indices into August. During 1989, however, neither of June or July peaks were present. The cool trough in mid July was deeper with a broader and similar progressive rise in late July interrupted by a long cool period in the first half of August. Although indices in the latter half of August were generally higher than in 1988, there were lower night temperatures and the summer as a whole was considerably less stressful.

During June, the Department of Health reviewed heat surveillance policies, briefed local health administrators and met with R.D. Ross, Director of the State Emergency Management Agency. News releases were issued in July.

A statewide heat warning was issued July 11, 1989 when the heat index reached 106 in St. Louis, 106 in Kansas City and 110 in Cape Girardeau. Heat indices remained at 105 or above for only one day except in Cape Girardeau where the heat index remained 105 or above for four days. In 1988, heat indices reached 105 or above in four out of five areas of the state on five separate occasions. Two statewide heat alerts and one heat warning were issued.

Heat-related illnesses and deaths reported in 1989 were less than one-third of those reported in 1988. The St. Louis area accounted for the majority of reported heat-related illnesses and deaths in 1989. St. Louis public health authorities declared six heat warnings, one of which was elevated to a heat alert for four days.

With three exceptions, the persons who died in 1989 were over 65 and not using air conditioning. Fatalities included a male in his 50's found under a St. Louis porch surrounded by liquor bottles; a jogger in his 40's in St. Louis County; and a heavily clad jogger in his 30's found along a path in Kansas City. In the age range of 66 to 90 years, five had known predisposing illnesses or prescriptions. Seven of the 10 were black.

Heat-related deaths in 1988 included six in age range 30 to 63 years. The age range on 21 others for whom age is known is from 67 to 90, with the majority in their 70's and 80's. This age distribution is distinctly skewed to the older ages in 1988 compared to 1989. The race is known for 22 of whom 15 were white and only seven were black (32%). This distribution is also quite different from 1989. Five were known to have been taken alive to hospitals where they later died and eight were found dead; detailed circumstances are not known for the others.

The Centers for Disease Control will fund a joint study with Dr. Laurence Kalkstein of the University of Delaware which will continue to analyze Missouri deaths and weather related factors. This may lead to a better method of establishing heat stress advisories for the state.

The Department of Health would like to thank all participants of the Heat Surveillance System. For more information, please contact the Section of Disease Prevention, 314/ 751-6128. ■

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Published by the
Missouri Department of Health
Division of Environmental Health
and Epidemiology Services
P.O. Box 570, 1730 E. Elm Street
Jefferson City, MO 65102-0570
Telephone: (314) 751-6080
Toll-free No.: 800-392-0272

AIDS Statistics

October 7, 1989

Missouri Department of Health
Bureau of AIDS Prevention

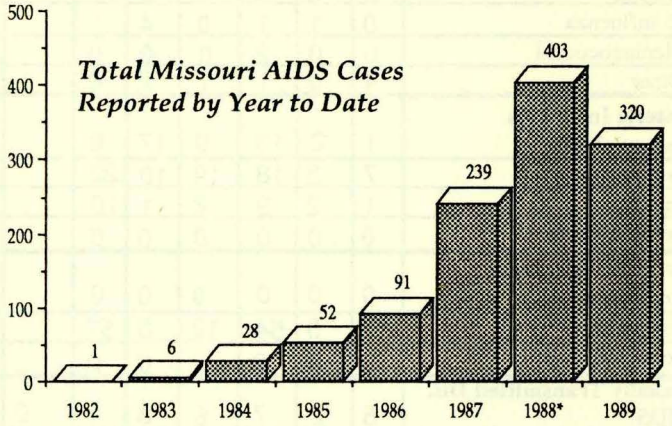
Total AIDS Cases to Date

U.S. AIDS case reports	105,990	
U.S. AIDS deaths reported	61,655	58.2%
Missouri AIDS case reports	1,140	
Missouri AIDS deaths reported	624	54.7%
Cases reported in Missouri with official residence elsewhere	207	

Total tested by State Laboratory

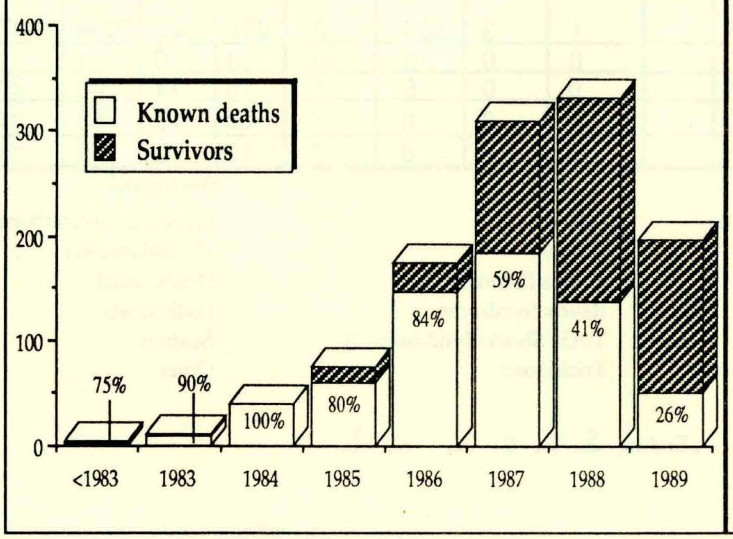
	# of Tests	# Positive	Percent Positive
1986	2,620	306	11.6%
1987	14,508	441	3.0%
1988	39,203	698	1.8%
1989 (to date)	43,499	663	1.5%

Cases Reported in Missouri, 1982-1989 to date



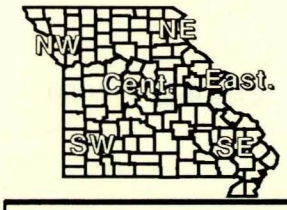
*One 1988 case diagnosed in 1969

Case Reports and Case Fatality Rate by Year of Diagnosis



Cumulative AIDS Cases and Deaths Reported 1982-1989 to Date

	Cases	Deaths
St. Louis City	271	171
St. Louis County	143	86
Kansas City	436	196
Springfield/Greene Co.	40	25
Fed. Prison Med. Center	20	12
Outstate Missouri	230	134
Missouri Total	**1140**	**624**



Missouri Department of Health
Disease Prevention - Communicable Disease Control
BIMONTHLY MORBIDITY REPORT

Reporting Period *
July & August, 1989

	Districts							KANSAS CITY	ST. LOUIS CITY	ST. LOUIS CO.	SPGFLD GREENE CO.	2 MONTH STATE TOTALS		CUMULATIVE		
	** NW	NE	CD	SE	** SW	** ED	*** OTHER					1989	1988	FOR 1989	FOR 1988	5 YR MEDIAN
Vaccine Preventable Dis.																
Chickenpox	11	25	11	36	15	59		0	0	0	0	157	22	6824	7026	
Diphtheria	0	0	0	0	0	0		0	0	0	0	0	0	0	0	
Influenza	0	0	0	0	0	0		0	0	0	0	0	7	245	122	
Measles	2	0	0	0	4	2		0	0	54	0	62	2	369	2	
Mumps	0	0	0	3	0	0		1	0	1	0	5	0	53	30	
Pertussis	14	2	2	9	11	7		1	6	11	1	64	9	91	15	
Polio	0	0	0	0	0	0		0	0	0	0	0	0	0	0	
Rubella	1	0	0	0	0	0		0	0	0	0	1	0	4	0	
Tetanus	0	0	0	0	0	0		0	0	0	0	0	0	1	1	
Viral Hepatitis																
A	7	1	5	9	8	15		83	13	16	1	158	159	495	534	
B	6	6	24	10	7	12		44	9	14	2	134	121	481	413	
Non A - Non B	0	0	0	2	1	1		1	0	1	0	6	6	29	34	
Unspecified	0	0	1	1	1	0		0	0	0	0	3	3	6	12	
Meningitis																
Aseptic	8	6	4	2	5	12		33	3	10	2	85	37	125	67	
H. influenza	0	1	1	0	4	1		3	0	1	0	11	14	64	82	
Meningococcal	0	0	2	0	0	0		0	0	0	0	2	4	13	22	
Other	4	0	1	1	2	0		4	0	1	0	13	7	41	35	
Enteric Infections																
Campylobacter	1	2	13	9	17	8		8	17	31	17	123	106	338	276	
Salmonella	7	3	18	19	10	22		41	22	18	7	167	217	463	456	
Shigella	1	2	9	2	1	10		24	18	22	1	90	97	312	368	
Typhoid Fever	0	0	0	0	0	0		0	0	1	0	1	0	2	1	
Parasitic Infections																
Amebiasis	0	0	0	0	0	0		0	0	1	0	1	7	9	20	
Giardiasis	12	5	54	12	3	57		16	3	65	13	240	176	507	359	
Toxoplasmosis	0	0	0	0	0	0		1	0	0	0	1	3	2	15	
Sexually Transmitted Dis.																
AIDS	5	2	7	6	3	1	0	29	21	9	3	86	58	245	263	
Gonorrhea	107	14	87	88	32	25		1244	1713	535	39	3884	3260	12755	10594	
Genital Herpes	24	16	40	16	18	15		60	62	31	8	290	494	1429	1507	
Nongonoc. urethritis	36	13	39	30	10	23		266	566	336	9	1328	1271	4653	4973	
Prim. & Sec. syphilis	1	0	1	0	1	0		17	6	2	0	28	22	95	83	
Tuberculosis																
Extrapulmonary	0	0	2	2	1	1	1	5	1	0	0	13	11	31	28	
Pulmonary	4	1	5	6	2	2	2	9	2	7	0	40	39	137	154	
Zoonotic																
Animal Bites	166	52	60	139	61	83		1	3	501	0	1066	1025	2994	2847	
Psittacosis	0	0	0	0	0	0		0	0	0	0	0	0	1	1	
Rabies (Animal)	0	0	0	5	4	1		0	0	5	1	16	14	48	24	
Rocky Mtn. Sp. Fever	4	0	4	5	4	3		1	0	0	2	23	16	53	34	
Tularemia	1	0	4	7	3	0		2	0	0	2	19	12	32	33	

Low Frequency Diseases

Anthrax
Botulism
Brucellosis - 1
Chancroid
Cholera
Cryptosporidiosis
Encephalitis (infectious)- 2
Encephalitis (viral/arbo-viral)
Granuloma Inguinale
Kawasaki Disease - 2
Legionellosis - 5
Leptospirosis - 2
Lymphogranuloma Venereum
Malaria - 3
Plague
Rabies (human)
Reye's Syndrome
Toxic Shock Syndrome - 3
Trichinosis

Outbreaks

Foodborne/Waterborne
Histoplasmosis
Nosocomial
Pediculosis
Scabies
Other

*Reporting Period Beginning July 02, Ending Sept 02.

**Totals do not include KC, SLC, SLCo, or Springfield

***State and Federal Institutions

Due to data editing, totals may change.

Missouri
EPIDEMIOLOGIST

Volume XI, Number 5 *November-December 1989*

Aquarium-Associated *Plesiomonas shigelloides* Infection in a Child

Sue Tippen; Robert Brady, D.V.M.; Denny Donnell, M.D.; Arlon Meyer, Eric Blank, Dr.P.H.

In July 1988, a community hospital in southeastern Missouri reported isolating *Plesiomonas shigelloides* from the stool of a child. The child was a 14-month-old girl with symptoms of diarrhea and fever. Her diarrha was watery and without blood or mucus. Her highest rectal temperature recorded was 102° F. Her stool was negative for campylobacter, salmonella, shigella, yersinia, aeromonas, and rotavirus. She was treated with trimethoprim and sulfamethoxazole, and her illness lasted five days. According to the child's mother, she had consumed no shellfish and had never travelled more than 80 miles from her home. She had consumed water only from public supplies and had waded in two area lakes. She attended a day-care center, but no other children in her age group were reported ill. Further investigation revealed no aquarium at her home and no close association with animals. However, one night each week the child stayed in the home of a babysitter for several hours. When interviewed, the babysitter reported she had an aquarium of tropical fish in her apartment. She identified the fish as piranhas. When the aquarium is cleaned, the water is poured into the bathtub. The child is always bathed in the bathtub before going home and the babysitter admitted the child could have been bathed directly after the aquarium water was poured into the bathtub. Samples of aquarium water were submitted to the State Public Health Laboratory, and *P. shigelloides* was isolated from the water.

To estimate the prevalence of *P. shigelloides* in tropical fish tanks, aquarium water samples from around the State of Missouri were surveyed (Table 1). Samples were taken from 18 aquariums (14 at 10 pet shops, three at two private homes, and one aquarium at a restaurant.) At least two tanks in Missouri's six regional health districts were sampled. *P. shigelloides* was isolated from four (22%) of the 18 tanks. The four tanks were located in three different pet shops: two in central Missouri, one in eastern Missouri. Employees of the two pet shops reported no health problems in the fish in the culture-positive tanks.

Editorial Note: P. shigelloides is a gram-negative bacterial rod. It has been epidemiologically implicated as a cause of diarrhea, but its pathogenicity has not been proven.[1] It has been isolated from surface water, the gut of freshwater fish, and many animals, including dogs and cats. It is primarily found in tropical and subtropical habitats, with its distribution in nature limited by its minimum growth temperature of 8° C.[2] Correspondingly, most human isolates have been from stools of patients with diarrhea living in tropical and subtropical regions of Asia, Africa, and Australia. Isolations from Europe and the United States have been rare and usually associated with foreign travel or consumption of raw oysters.[3,4] Such cases typically have had self-limited diarrhea with blood and mucus in the stool. A recent study showed that antibiotic therapy shortened the duration of illness.[5] P. shigelloides can also cause cellulitis and septicemia. A review of the literature revealed no other reports of P. shigelloides gastrointestinal infections associated with aquarium water. However, infection with the organism is not a routinely reportable condition, and it is certainly possible that other cases or even small outbreaks may have gone undetected. Tropical fish owners should observe such precautions as handwashing after contact with aquarium water.

Inside this issue...

TABLE 1.
Results of fishtank survey for Plesiomonas shigelloides

Source	Fish Species Present	*P. shigelloides* isolated
Pet shop	Firemouths	Yes
Pet shop	Marigold tux variatus	Yes
Pet shop	Oscars	Yes
Pet shop	Swordtails, barbs, gourami	Yes
Pet shop	African chichlids	No
Pet shop	Angelfish	No
Pet shop	Discus	No
Pet shop	Goldfish	No
Pet shop	Mollies	No
Pet shop	Oscars, firemouths, Jack Dempseys	No
Pet shop	Pictus catfish, colored glass	No
Pet shop	Piranhas	No
Pet shop	Sharks	No
Pet shop	Zebra danio	No
Commercial	Oscars	No
Private home	Chinese algae eaters goldfish	No
Private home	Mauris, catfish	No
Private home	Tetras	No

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4. Holmberg SD, Wachsmuth IK, Hickman-Brenner FW, Blake PA, Farmer JJ. Plesiomonas enteric infections in the United States. Ann Int Med 1986;105:690-4.
5. Kain KC, Kelly, MT. Clinical features, epidemiology, and treatment of Plesiomonas shigelloides diarrhea. J Clin Microbiol 1989;27:998-1001.

Ms. Tippen is the Communicable Disease Coordinator for Southeast Missouri; Dr. Brady is an Epidemic Intelligence Service Officer assigned to Missouri.; Dr. Donnell is State Epidemiologist and Arlon Meyer and Dr. Blank provided support through the State Public Health Laboratory.

Publications Available:

Strategic Plan for Elimination of Tuberculosis

The Strategic Plan for the Elimination of Tuberculosis in the United States was published in the April 21, 1989 *Morbidity and Mortality Weekly Report (MMWR).* This plan was developed by an advisory committee established by the US Department of Health and Human Services. The committee urges the nation to establish the goal of elimination (a case of less than one per million population) by the year 2010.

Missouri has responded to this national challenge with a plan of its own. A Missouri plan has been prepared by a committee of health care professionals in the public, private and voluntary sectors throughout the state. This committee, appointed by the Boards of the American Lung Association constituents in Eastern and Western Missouri, has become known as the Missouri Advisory Committee for the Elimination of TB (MACET). To obtain copies of the national and state plans, contact the *Bureau of Tuberculosis Control, 800/392-0272.* ■

Tuberculosis in Missouri Correctional Centers

Bert Malone, Chief, Bureau of Tuberculosis Control

The following article documents the increasing problem of tuberculosis (TB) among inmates of prisons and jails, including Missouri correctional facilities. The incidence rate has increased dramatically in the last three years with a rate of 21.5 per 100,000 population in 1987 compared to rates of 43.0 in 1988 and 50.2 in 1989 (through December 5, 1989).

The higher incidence of TB in correctional centers can most likely be attributed to two factors:

— Higher representation of population groups at increased risk for TB in prisons and jails, including many individuals from inner-cities, minorities and economically disadvantaged populations.

— Increased likelihood of transmission of tuberculosis infection within these facilities.

The close living conditions found in most prisons and jails, coupled with the rising incidence of infectious cases has resulted in increased transmission of infection within correctional centers.

An additional factor would include the association between human immunodefficiency virus (HIV) infection and tuberculosis. Evidence has shown that individuals who are infected with HIV are at very high risk of developing TB, probably due to the reactivation of latent infection associated with HIV-induced immune suppression. In Missouri, only one individual has been reported from a state correctional facility with both conditions of TB and the acquired immunodeficiency syndrome (AIDS). However, among inmates in the federal correctional system, 13 inmates have been reported with both conditions. These individuals are hospitalized at the United States Medical Center for Federal Prisoners (MCFP) in Springfield, Missouri.

The Missouri Department of Health has worked closely with representatives of the state and federal correctional facilities to develop and implement appropriate TB control measures. Specific recommendations have been given which include screening of all new inmates upon entry, chest x-rays of persons with positive skin test reaction, persons with HIV infection, and persons with symptoms suggestive of TB. Additional recommendations have been designed for the medical and epidemiological management of TB in these facilities.

Implementation of these control measures are essential if tuberculosis is to be eliminated as a health concern in correctional centers. Efforts of the Missouri Department of Health will be directed toward that goal in the months ahead.

If you have questions regarding TB, please call your local health department or the Bureau of Tuberculosis Control, 800-392-0272. ■

Prevention and Control of Tuberculosis in Correctional Institutions: Recommendations of the Advisory Committee for the Elimination of Tuberculosis

(Reprinted from *Morbidity and Mortality Weekly Report*, May 11, 1989)

These recommendations are designed to assist federal, state, and local correctional officials in controlling tuberculosis (TB) among inmates and staff of correctional facilities (e.g., prisons, jails, juvenile detention centers). This document addresses issues unique to correctional institutions; more general information about TB is available in the official American Thoracic Society (ATS)/CDC statements.)

Background

TB remains a problem in correctional institutions, where the environment is often conducive to airborne transmission of infection among inmates, staff, and visitors. In a survey of TB cases reported during 1984 and 1985 by 29 state health TB among inmates of correctional institutions was more than three times higher than that for nonincarcerated adults aged 15-64 years (CDC, unpublished data). Since 1985, 11 known TB outbreaks have been recognized in prisons in eight states (CDC, unpublished data). In addition, in some large correctional systems, the incidence of TB has increased dramatically. Among inmates of the New York State system, TB incidence increased from an annual average of

15.4 per 100,000 population during 1976-1978 to 105.5 per 100,000 in 1986. In New Jersey during 1987, the incidence of TB among state inmates was 109.9 per 100,000—a rate 11 times that of the general population in New Jersey that year (New Jersey State Department of Health, unpublished data). In a survey of California Department of Corrections facilities, the TB incidence among inmates during 1987 was 80.3 per 100,000—a rate nearly six times California's general population for that year (California Department of Health Services, unpublished data).

Human immunodeficiency virus (HIV) infection among prisoners in a number of geographic areas heightens the need for TB control among inmates. According to a National Institute of Justice (NIJ) survey, as of October 1988, a cumulative total of 3136 confirmed acquired immunodeficiency syndrome (AIDS) cases had been reported among U.S. inmates since 1981—2047 cases by 44 of 51 state and federal systems and 1089 cases by 26 responding city and county jail systems.

These reported AIDS cases represent a 60% increase since a similar survey was conducted in 1987. The incidence of AIDS among prisoners has been reported as markedly higher than among the total US population. During 1988, the incidence of AIDS in the US population was 13.7 per 100,000.* During the same year, the estimated aggregate incidence for state/federal correctional systems was 75 cases per 100,000.** Rates for individual systems ranged from 0 to 536. Although more than half the states have rates less than or equal to 25, eight state systems have rates greater than or equal to 100. The aggregate rate for 26 responding city/county jail systems was 183 per 100,000. However, rates in city/county jails were described by NIJ as "extremely suspect" because of rapid turnover of population.

HIV infection in persons with latent tuberculous infection appears to create a very high risk for development of TB. One review of AIDS cases among inmates in selected New York correctional facilities found TB in 22 (6.9%) of 319 persons with AIDS.

Transmission of TB in correctional facilities presents a health problem for the institutions and may also be a problem for the community into which inmates are released. Each year, more than eight million inmates are discharged from local jails and more than 200,000 from state and federal prisons. Because the median age of inmates on release is relatively young —27 years —the total lifetime risk for TB in persons infected during incarceration is considerable.

General Guidelines

Control of TB is essential in correctional health care. Each correctional institution should designate an appropriately trained official responsible for operating a TB prevention and control program in the institution. A multi-institutional system should have a qualified official and unit to oversee TB-control activities throughout the system. These responsibilities should be specified in the official's job performance plan. The basic activities to be followed are surveillance, containment, and assessment.

Surveillance refers to identification and reporting of all TB cases in the system or institution and identification of all inmates and staff who are infected with TB (i.e., those with positive skin tests). New cases and newly infected persons must be quickly identified, and appropriate therapy begun.

Containment refers to ensuring that transmission of tuberculous infection does not occur. Appropriate diagnostic, treatment, prevention, and laboratory services must be available. Environmental factors conducive to the spread of TB, such as poor ventilation, should be corrected. Prison officials must ensure that persons undergoing treatment or preventive therapy be carefully monitored for compliance and drug toxicity and complete an appropriate course of treatment.

Assessment refers to prison officials' responsibility for knowing whether the surveillance and containment activities are being carried out effectively.

Surveillance Diagnosis

The intracutaneous Mantoux tuberculin test (not multiple puncture tests) should be used to identify

**The incidence for the population at large was calculated as follows: (total number of cases reported to CDC in 1988 - total population) x 100,000.*

***Incidence for correctional inmates was approximated from a point prevalence as follows: (AIDS patients in the system at the time of the survey -current inmate population of the system) x 100,000. Data on number of cases by year reported are not available for most correctional systems. The method used may underestimate the actual annual incidence in a correctional system.*

persons infected with tubercle bacilli. Generally, for correctional institution staff and inmates, a tuberculin skin-test reaction greater than or equal to 10 mm induration is considered positive. However, a reaction of greater than or equal to five mm is considered positive in persons who have had close recent contact with an infectious person and in persons who have an abnormal chest radiograph consistent with TB. In addition, infected persons who are immunosuppressed for any reason may show little or no reaction to the tuberculin test. Therefore, a tuberculin skin-test reaction in a person known to be infected with HIV should be considered positive if induration is greater than or equal to five mm.

Skin testing of inmates and staff should be carried out at entry or on employment, respectively. Each skin test should be administered and read by appropriately trained personnel and recorded in mm induration in the personal medical record. All inmates and staff should participate, except those providing documentation of a previous positive reaction to the tuberculin test.

In jails with a rapid turnover of inmates, authorities may decide not to tuberculin test new detainees who are unlikely to remain in the system or in that facility for greater than seven days. However, provision must be made for appropriate diagnostic measures (e.g., sputum smear and culture and/or chest radiograph) for all persons who are symptomatic. (See Containment.)

In most correctional institutions, skin-test-negative inmates and employees having contact with inmates should have repeat skin tests at least annually. If data from previous screening and TB case-finding are available, the frequency for repeat skin testing should be determined based on the need for timely surveillance information. Observed risk of new tuberculous infection is the most useful evaluation criterion to consider. In institutions with a historically low risk of tuberculous infection (e.g., less than 0.5% of persons with skin-test conversions annually), an increase in AIDS cases or TB cases should be viewed as indicating a need for more frequent skin testing and intensified casefinding activities.

Persons with positive skin-test reactions and all persons with symptoms suggesting TB (e.g., cough, anorexia, weight loss, fever) should receive a chest radiograph within 72 hours of skin-test reading or identification of symptoms. Correctional health-care personnel should be aware of the often atypical signs and symptoms of TB in persons with HIV infection. Inmates with abnormal chest radiographs and/or symptoms compatible with TB should also have sputum smear and culture examinations. Sputum should be submitted for smear and culture examination from persons with pneumonia or bronchitis symptoms that fail to abate promptly after initiation of antibiotic treatment. Three specimens should be collected, preferably once daily on three consecutive days. In the absence of spontaneous production of sputum, aerosol induction in a properly ventilated area should be used to obtain specimens.

Tuberculin skin-test anergy may be a relatively late development in the progression from HIV infection to AIDS; consequently, inmates with known or suspected HIV infection (including those with nonreactive tuberculin tests) should receive a chest radiograph as part of initial screening, regardless of tuberculin skin-test status.

Case Reporting

Whenever TB is suspected or confirmed among inmates or staff, this information should be immediately entered into the TB-control records at the institution and at the headquarters level, if in a multi-institutional system. The local or state health department should also be notified, as required by state and local laws or regulations.

Contact Investigation

Because TB is transmitted by the airborne route, persons at highest risk for acquiring infection are "close contacts" (e.g., persons who sleep, live, work, or otherwise share air with an infectious person through a common ventilation system). When a person with suspected or confirmed TB appears to be infectious (e.g., has pulmonary involvement on chest radiograph and cough, and/or positive sputum smear), close contacts must be skin tested unless they have a documented history of a positive tuberculin test. Close contacts with a positive tuberculin reaction or a history of a previous positive test and symptomatic persons, regardless of skin-test results, should receive immediate chest radiographs to detect evidence of pulmonary TB.

Depending on the ventilation in an institution, close contacts could include all cellmates, all inmates and staff on a tier, or all inmates and staff in a building. Health department staff should be consulted to determine who should be tested. When tuberculin converters are found among the close contacts, other persons with less contact may need to be examined. Every effort should be made by medical and nonmedical staff to ensure the confidentiality of persons with TB.

Close contacts with positive tuberculin reactions but without TB should be given at least six months' preventive therapy (see Preventive Therapy, below) unless medically contraindicated. Close contacts who do not have a positive tuberculin reaction and who are asymptomatic should have a repeat tuberculin test 10-12 weeks after contact has ended.

Contacts with known or suspected HIV infection should be considered for a 12-month course of preventive therapy, regardless of skin-test results, if evidence indicates that the source patient was infectious.

A patient with clinical TB may have negative sputum smears or cultures, especially if recently infected. Close contacts of such persons should also be examined to detect a source case and other newly infected inmates or staff.

Containment Isolation

Persons with suspected or confirmed TB who have pulmonary involvement on chest radiograph, cough, and/or a positive sputum smear should be immediately placed in respiratory isolation (e.g., housed in an area with separate ventilation to the outside, negative air pressure in relation to adjacent areas, and at least four to six room air exchanges per hour). It may be necessary to move a patient to another facility or hospital with a respiratory isolation facility.

Respiratory isolation should continue until patients are on appropriate therapy and at least three consecutive daily negative sputum smears indicate that respiratory precautions may be removed. No special precautions are needed for handling patients' dishes, books, laundry, bedding, or other personal items.

Inadequate or interrupted treatment for TB can lead to drug-resistant TB and transmission of infection. Therefore, after effective medications have begun, it is of utmost importance to keep the patient on medication until completion of therapy, unless signs or symptoms of an adverse reaction appear. Arrangements must be made with the health department for continued medication and follow-up before an inmate with TB is released. Similar arrangements should be made before the release of inmates on preventive therapy.

Because crowding and poor ventilation are conducive to transmission of TB, improvements in housing conditions can help prevent outbreaks. Installing ultraviolet lights may be helpful in prisons where transmission of tuberculous infection has been a problem. Although the effectiveness of ultraviolet lights in decreasing TB transmission in such settings has not been confirmed by epidemiologic studies, ultraviolet lights have been used to reduce transmission of TB in hospitals and shelters for the homeless. When ultraviolet lights are used, proper installation and maintenance is essential.

Treatment

ATS/CDC recommendations should be followed for treatment and management of persons with confirmed or suspected TB. Each dose of medication should be administered by a designated ancillary medical staff person who watches the inmate swallow the pills. The medication may be given twice weekly (with appropriate change in dosage) after 1-2 months of daily medication. To ensure continuing compliance, if a patient is to be discharged before completion of therapy, the health department should be notified before the inmate is released.

Persons with positive smears or cultures at the beginning of therapy should be monitored by repeat sputum examinations for treatment response until they become smear-negative. Treatment failure is usually due to patient noncompliance with therapy but may be due to the presence of drug-resistant organisms.

All patients must be monitored by trained personnel for signs and symptoms of adverse reactions during chemotherapy. Expert medical consultation regarding monitoring and/or treatment of patients with complications (e.g., AIDS, drug resistance, adverse reactions, pregnancy, nonpulmonary TB) should be sought when necessary. Special emphasis should be placed on close supervision and care of TB patients infected with drug-resistant organisms.

Inmates with TB should be routinely offered testing with appropriate counseling for HIV infection. The presence of HIV infection necessitates longer treatment for TB and continued close observation for adverse drug reactions, treatment failure, and relapse.

Preventive Therapy

All inmates and staff with positive tuberculin reactions who have not previously completed an adequate course of preventive therapy should be considered for preventive therapy unless there are medical contraindications. Eligible inmates include those who will be incarcerated long enough to complete at least one month of continuous therapy; provisions should be made before release for the health department to oversee completion of at least six months of appropriate therapy (unless HIV infected; see below).

HIV-antibody testing should be offered to all known tuberculin-positive inmates. Tuberculin-positive persons with concurrent HIV infection appear to be at very high risk for TB and have highest priority for preventive therapy, regardless of age. Efforts should be made to encourage persons with known or suspected HIV infection to complete 12 months of therapy.

Each dose of preventive therapy should be administered by a designated ancillary medical staff person who watches the patient swallow the pills. Since daily supervised therapy is often not feasible, twice-weekly supervised therapy is a satisfactory alternative.

Most experts believe twice-weekly intermittent preventive therapy (using isoniazid (INH) 900 mg) is effective, although it has not been

studied in controlled clinical trials. Medication should not be given to an inmate without direct observation of drug ingestion.

All persons on preventive therapy must be monitored by trained personnel for signs and symptoms of adverse reactions during the entire treatment period. Some prison inmates will have underlying liver disease related to previous alcohol or narcotic abuse. Although chronic liver disease is not a contraindication to INH preventive therapy, such patients should be carefully monitored.

Persons for whom TB preventive therapy is recommended but who refuse or are unable to complete a recommended course should be counselled to seek prompt medical attention if they develop signs or symptoms compatible with TB. Routine periodic chest radiographs are generally not useful for detecting disease in the absence of symptoms; chest radiographs should be reserved for persons with symptoms, especially a persistent cough.

Assessment

Inmates are transferred frequently. Thus, record systems for tracking and assessing the status of persons with TB and tuberculous infection in the prison facilities are essential. These systems must be maintained by using current information on the location, treatment status, and degree of infectiousness of these persons. Prompt action must be taken to assure reinstitution of drug therapy should treatment lapse for any reason.

The record systems should also provide data needed to assess the overall effectiveness of TB-control efforts, and the following information should be reviewed at least every six months:

1. Tuberculous infection prevalence and tuberculin conversion rates for inmates and staff within each institution;
2. Case numbers and case rates;
3. Percentage of TB patients recommended for therapy who complete the prescribed six-month course of directly observed therapy in 6-9 months (goal is greater than or equal to 95%);
4. Percentage of patients with culture-positive sputum that converts to culture negative within three months of starting treatment (goal is greater than or equal to 90%);
5. Percentage of persons placed on INH preventive therapy who complete at least six months of directly observed therapy (goal is greater than or equal to 90%). In multi-institutional systems, these data should be compiled for individual institutions and for the system as a whole, with results provided to corrections and health department officials.

Role of the Health Department

Health departments should assist correctional institutions in developing and updating policies, procedures, and record systems for TB control. The health department should also provide access to expert TB medical consultation. A specific health department contact person should be designated to provide epidemiologic and management assistance to correctional facilities, and this responsibility should be an element in the designated person's job performance plan. This responsibility may require considerable initial onsite consultation and subsequent semiannual evaluation for correctional institutions.

Health department staff should assist in developing programs to train correctional institution staff (e.g., to perform, read, and record tuberculin skin tests; identify signs and symptoms of TB; initiate and observe therapy; monitor for side effects; collect diagnostic specimens; educate inmates; maintain record systems). Health or corrections departments may wish to grant certification to correctional staff completing this training.

Health departments should also provide consultation for contact examinations within correctional institutions and assure appropriate examinations for nonincarcerated contacts of persons with TB who are identified in these institutions.

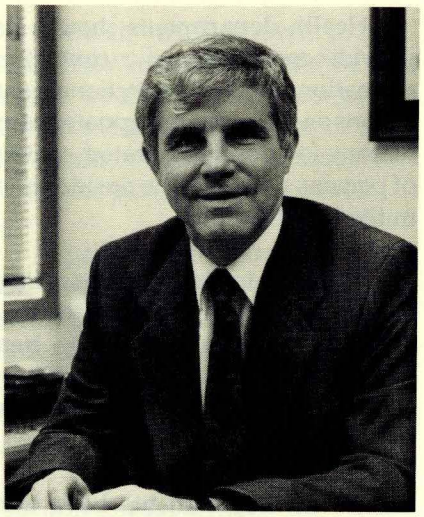
In addition, health departments should cooperate with correctional staff in arranging continuing treatment for inmates released while receiving TB treatment or preventive therapy.

Health departments have a responsibility to maintain TB registries with updated medical information on all current TB cases within their jurisdictions, including those in correctional institutions. Records should be assessed quarterly, and necessary revisions in policies or procedures should be recommended. In addition, health departments should periodically assess the impact of correctional institution-acquired TB and tuberculous infection on the community as a whole.

Because inmates may have both TB and HIV infection, health department officials should assist correctional institutions in developing and implementing HIV prevention programs. Such programs include strategies to identify persons practicing high-risk behaviors, to counsel those infected with HIV, and to reduce high-risk behaviors among all inmates.

As circumstances change, these recommendations will be periodically revised. They are not intended to discourage new and innovative approaches for dealing with TB prevention and control in prisoners. The recommendations should be used instead to enhance the quality of medical care for persons in correctional institutions.

NOTE: For a complete list of references, contact the Bureau of Tuberculosis Control, 800/392-0272 or 314/751-6122. ■



Bill Schmidt to head environmental health and epidemiology division

William (Bill) R. Schmidt begins duties as director, Division of Environmental Health and Epidemiology.

After serving as Assistant Administrator for Public Health Services for the Wisconsin Division of Health the last six years, Bill Schmidt will join the Missouri Department of Health as division director of Environmental Health and Epidemiology during January 1990. Bill is excited to be joining the DOH team; "I expect to work closely with local public health agencies on a number of different programmatic issues." He also mentioned the commitment of this state's policy makers to public health issues.

Bill received a Bachelor of Arts degree from Loras College, Dubuque, Iowa and Bachelor of Science from The Johns Hopkins University in Baltimore. He earned his Masters in Public Health from the University of North Carolina in 1971.

As Division Director, he will oversee the Bureaus of Environmental Epidemiology; Community Sanitation; Radiological Health; AIDS Prevention and Veterinary Public Health as well as the State Public Health Laboratory and Section of Disease Prevention. This section includes the Bureaus of Sexually Transmitted Diseases, Tuberculosis Control, Immunizations and Communicable Disease Control. ■

Missouri EPIDEMIOLOGIST

Published by the
Missouri Department of Health
Division of Environmental Health
and Epidemiology Services
P.O. Box 570, 1730 E. Elm Street
Jefferson City, MO 65102-0570
Telephone: (314) 751-6080
Toll-free No.: 800-392-0272

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Successful Fall 1989 AIDS Conference

Sue Dabney, Bureau of AIDS Prevention

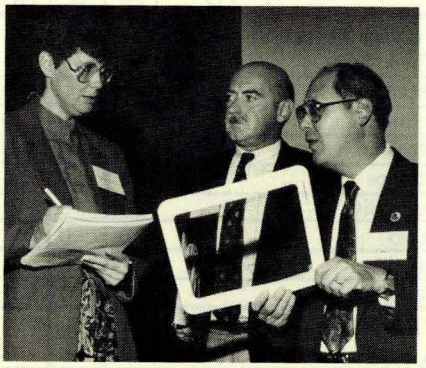
The Missouri Department of Health, Bureau of AIDS Prevention held a fall conference at the Allis Plaza Hotel in downtown Kansas City, Missouri on October 19 and 20, 1989. The conference, entitled ***Where we are, where we're going . . . AIDS controversies of the 1990s,*** addressed important AIDS issues including counseling of the HIV-tested patient, effective approaches to AIDS education in minority communities, responsible media coverage of the epidemic, the religious perspective, and living with AIDS.

Joining DOH and BAP as co-sponsors were the Kansas City, Missouri Health Department AIDS Program, the Metropolitan St. Louis AIDS Program, and the Midwest AIDS Training and Education Center (MATEC). The conference was attended by 196 and featured 26 speakers. The presentations were divided into 12 workshops and panel discussions and three main sessions.

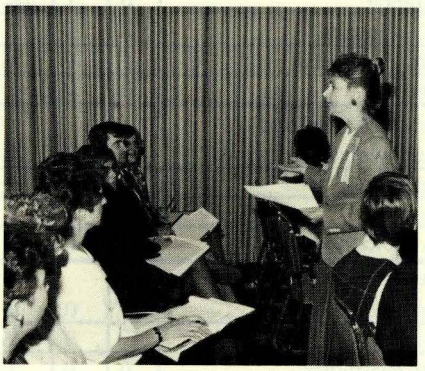
The three featured speakers were Jan Zita Grover of San Francisco General Hospital, Cleve Jones, from the NAMES Project, and Dr. Charles Konigsberg, Director, Division of Health, Kansas Department of Health and Environment.

Ms. Grover spoke on responsible media coverage of the AIDS epidemic. Cleve Jones was the banquet speaker and talked about the evolution of the NAMES quilt project. Dr. Konigsberg outlined his role with the Presidential Commission on the HIV epidemic.

The Bureau of AIDS Prevention's spring 1990 conference will be held at the Stouffer Concourse Hotel in St. Louis, Missouri, on March 28-30 and will focus on AIDS in the minority communities. For further information on the 1990 conference, call Sue Dabney, Bureau of AIDS Prevention, at (314) 751-6438, or Dr. Ken Steiner, University of Missouri-Columbia, at (314) 882-4106. ■



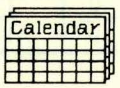
Featured speaker Dr. Charles Konigsberg, (right) Kansas Director of Health sharing statistics on HIV infection with two conference attendees.



Karen Northup conducting a workshop on the Missouri Care Coordination Program.

Important Notice

Beginning January 1, 1990, the handling fee for specimens submitted to the State Public Health Laboratory will be increased to *$5.00*. The fee increase will be reflected in your monthly statements. The fee had not been changed since its inception in 1983 and is needed to offset increased costs of supplies and shipping. Detailed information has been sent to local health agencies.



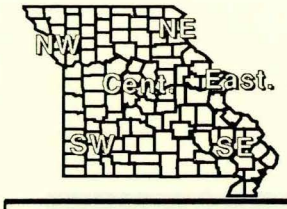
Upcoming Conferences

Missouri Milk, Food and Environmental Health Association Annual Education Conference
April 4 - 6, 1990, Osage Beach, Missouri

Tobacco Conference 1990
A Forum for Professionals
March 8, 1990, Jefferson City, MO

Missouri Public Health Association Annual Meeting
April 17-19, 1990, St. Louis, Missouri
call MPHA, 314/634-7977 for details

Spring 1990 AIDS Conference
Stouffer Concourse Hotel, St. Louis, Missouri
March 28-30, 1990



Missouri Department of Health
Disease Prevention - Communicable Disease Control

BIMONTHLY MORBIDITY REPORT

Reporting Period *
September & October, 1989

	Districts							KANSAS CITY	ST. LOUIS CITY	ST. LOUIS CO.	SPGFLD GREENE CO.	2 MONTH STATE TOTALS		CUMULATIVE		
	** NW	NE	CD	SE	** SW	** ED	*** OTHER					1989	1988	FOR 1989	FOR 1988	5 YR MEDIAN
Vaccine Preventable Dis.																
Chickenpox	67	34	49	79	32	41		0	0	2	0	304	35	7128	7061	
Diphtheria	0	0	0	0	0	0		0	0	0	0	0	0	0	0	
Influenza	0	0	0	0	0	0		0	0	0	0	0	0	245	142	
Measles	2	0	0	0	0	0		0	0	81	0	83	0	452	2	
Mumps	1	1	0	1	0	2		1	0	0	0	6	4	60	34	
Pertussis	0	0	0	0	0	0		0	0	0	0	0	7	91	22	
Polio	0	0	0	0	0	0		0	0	0	0	0	0	0	0	
Rubella	0	0	0	0	0	0		0	0	0	0	0	0	4	0	
Tetanus	0	0	0	0	0	0		0	0	0	0	0	0	1	1	
Viral Hepatitis																
A	7	1	6	7	6	9		58	9	13	0	116	165	615	702	
B	6	4	18	5	3	10		28	8	13	8	103	83	579	498	
Non A - Non B	0	0	1	5	0	1		4	0	1	1	13	9	43	43	
Unspecified	0	0	0	0	0	0		1	1	0	0	2	4	7	14	
Meningitis																
Aseptic	6	1	12	3	6	5		18	0	4	4	59	26	189	91	
H. influenza	2	0	2	1	1	1		0	1	1	4	13	12	75	93	
Meningococcal	1	0	1	0	0	0		2	0	0	0	4	5	17	29	
Other	0	0	1	1	1	0		2	1	2	0	8	11	49	49	
Enteric Infections																
Campylobacter	0	0	8	6	10	11		18	6	11	18	88	87	427	366	
Salmonella	7	0	18	15	11	15		21	9	15	15	126	174	590	636	
Shigella	0	1	1	8	3	6		30	4	3	1	57	139	369	510	
Typhoid Fever	0	0	0	0	0	0		0	0	0	0	0	1	2	2	
Parasitic Infections																
Amebiasis	0	0	0	0	1	0		1	0	2	0	4	5	13	25	
Giardiasis	17	9	26	7	8	37		36	1	27	10	178	158	695	510	
Toxoplasmosis	0	0	1	0	0	0		1	0	0	0	2	4	4	16	
Sexually Transmitted Dis.																
AIDS	13	3	5	1	2	0	2	51	17	4	1	99	83	344	346	
Gonorrhea	123	24	108	110	44	33		1524	1933	755	29	4683	3360	17438	13954	
Genital Herpes	33	15	25	7	35	14		99	86	52	10	376	319	1805	1826	
Nongonoc. urethritis	58	4	25	29	3	20		250	543	273	5	1210	1360	5863	6183	
Prim. & Sec. syphilis	3	0	0	5	0	4		13	4	0	0	29	39	124	122	
Tuberculosis																
Extrapulmonary	0	0	0	0	0	1	0	0	2	2	3	8	4	38	32	
Pulmonary	1	1	2	4	5	3	5	0	4	6	0	31	31	169	185	
Zoonotic																
Animal Bites	180	40	61	53	51	83		0	0	413	0	881	973	3875	3820	
Psittacosis	0	0	0	0	1	0		0	0	0	0	1	0	2	1	
Rabies (Animal)	0	0	2	1	1	0		0	1	3	0	8	4	56	33	
Rocky Mtn. Sp. Fever	0	0	1	2	2	0		1	0	0	1	7	15	54	50	
Tularemia	0	0	2	0	1	0		0	0	0	1	4	7	35	41	

Low Frequency Diseases

Anthrax
Botulism
Brucellosis
Chancroid
Cholera
Cryptosporidiosis
Encephalitis (infectious)
Encephalitis (viral/arbo-viral)- 1
Granuloma Inguinale
Kawasaki Disease
Legionellosis- 4
Leptospirosis
Lymphogranuloma Venereum
Malaria- 1
Plague
Rabies (human)
Reye's Syndrome
Toxic Shock Syndrome- 2
Trichinosis

Outbreaks

Foodborne/Waterborne -1
Histoplasmosis
Nosocomial -2
Pediculosis
Scabies -1
Other -1

*Reporting Period Beginning September 3, 1989 , Ending October 28, 1989

**Totals do not include KC, SLC, SLCo, or Springfield

***State and Federal Institutions

Due to data editing, totals may change.

Missouri EPIDEMIOLOGIST

Special Reporting Issue *June 1989*

Reporting —DOH's Foundation for Disease Control

The Missouri Department of Health (DOH) relies on local authorities to provide the groundwork for disease prevention and control. The importance of reporting the initial case cannot be stressed enough when factors such as infectious disease outbreaks, occupational, or environmental conditions occur.

Early reporting of infectious conditions is vital to public health agencies. This is demonstrated by the epidemic of AIDS and HIV-positive patients where rapid intervention strategies and education of patients and close contacts are essential to prevent further exposure to the public.

This issue will address not only the importance of reporting to public health agencies, but also the benefits derived for physicians and the medical community.

"...a major factor in physician underreporting is a lack of knowledge of the morbidity reporting system. ...our survey respondents indicated that attitudinal problems were secondary to a lack of knowledge as their reason for nonreporting."

Drs. Konowitz, Petrossian, and Rose based on a study of reporting done as third year medical students at Mount Sinai School of Medicine, NY Public Health Reports, Jan-Feb 1984.

Also included are the preferred mechanisms of how to report case findings and what is reportable.

DOH and your local health agency are available to assist you with reporting questions. Epidemiologists are available for consultation regarding infectious disease questions or to recommend environmental sampling when necessary.

Finally, the importance of providing feedback reports to the medical community is realized and accomplished through this newsletter.

Sue Heisler, Managing Editor

Inside this Issue:

Why Report Infectious Diseases?

H. Denny Donnell, Jr., M.D., M.P.H., Manager
Section of Disease Prevention

Disease reporting is required by state law. The Department of Health (DOH) is charged by state law with **safeguarding the health of the people.** The motto incorporated into Missouri's Great Seal, is a quote from the writings of Cicero: *"Salus Populi Suprema Lex Esto"*, which broadly translates to **"the wellbeing of the people is the supreme law"**. DOH is further charged to: 1) study the causes and prevention of diseases; 2) designate those which are infectious, contagious, communicable, or dangerous; 3) make and enforce adequate orders, findings, rules and regulations to prevent the spread of such diseases; 4) determine the prevalence of diseases within the state. In response to this legal obligation the Department has written a rule which designates reportable diseases and how and by whom they are to be reported. The people of the state, through their elected representatives, have made it a legal obligation that certain designated diseases be reported in order that there may be the opportunity to safeguard their health.

"Any person, including physicians, who knowingly conceals a case of contagious, infectious, or communicable disease shall be deemed guilty of a class A misdemeanor. ...the penalties for such misdemeanors include a fine not to exceed $1000, and/or imprisonment for a term not to exceed one year."

interpretation by Douglas L. Van Camp of Missouri statutes: published in Missouri Medicine, August, 1984.

Reporting infections permits DOH to cooperate with federal and international public health authorities. By agreements with the Centers for Disease Control (CDC) and the Council of State and Territorial Epidemiologists, certain disease reports are forwarded without identifying information to the CDC. This permits interstate comparisons and tracking of developing patterns of disease spread over the nation. Under International Health Regulations, the CDC in turn notifies WHO of the occurrence of any reported cases of plague, cholera, or yellow fever. Other diseases which are under surveillance by the WHO include louse-borne typhus fever and relapsing fever, paralytic polio, malaria, and viral influenza. **Reporting permits interstate and international disease surveillance.**

Reporting gives public health agencies the basis for active intervention to interrupt the spread of disease and to provide protective immunity or therapy. Questions raised by reports include:

1. Where did the patient acquire the infection?
2. Are there others infected from the same source?
3. Has the patient transmitted the infection to others?
4. Can we prevent others from becoming infected?

These questions often lead to communication with the attending physician, the patient or in some cases family or close contacts. It may be necessary to inspect foodhandling establishments, homes, water supplies, or other environmental situations. Findings may be the discovery of additional cases requiring therapy, susceptibles requiring immunization or chemoprophylaxis, environmental situations requiring cleanup, foodhandling or other facility policies requiring improvement. If necessary intervention cannot be accomplished rapidly, exposure will continue. It may be necessary to warn the public to avoid the situation or alert them to exercise a high index of suspicion regarding symptoms they may develop. **Reporting helps place barriers in the community to prevent the infection from spreading.**

Reporting helps physicians evaluate illnesses in their patients. Periodic feedback of disease data in aggregate form establishes a set of probability realities which can be applied in the diagnostic process. When the uncommon diagnosis appears likely, the physician can consult with the public health agency whether similar cases have been reported. When a patient has returned from travel, the possible infections in the area of travel are made known through the worldwide reporting networks of the World Health Organization and the CDC. **Feedback of reported data helps the physician to make better decisions and give patients better advice.**

Reporting informs the public and assists them to make better decisions regarding their own health and lifestyle.

Why Report Cont'd...

The general knowledge of endemic diseases in the community helps the public to:

1. Appreciate the need for vaccines and specific personal health measures and lifestyle changes which may be helpful in avoidance of infections.
2. Appreciate that certain symptoms may suggest known endemic infections and encourage them to seek appropriate diagnosis and therapy.

3. Seek health advice when traveling outside the community.

Reporting permits public health agencies to justify the acquisition of necessary funds to implement functions, to plan for resource allocation, and to evaluate their activities. The legislature and federal granting agencies take notice of reported disease levels as they make decisions regarding allocation of public monies. Public health agencies utilize reported disease data to estimate personnel, supply, and equipment needs in the annual budget process. Trends are observed to determine if levels of reported infections are changing and to compare geographic areas. **Reported data affect funding levels for public health agencies.**

As a result of a Petition for Permanent Injunction filed by the Missouri Division of Health (now Department of Health) against a Missouri laboratory, the Circuit Court of St. Louis issued an order on February 24, 1981, on reporting results of laboratory tests which are positive or suggestive of any reportable infectious disease. The Court ordered compliance with 13CSR 50-101.090 (effective September 13, 1948), which requires that such tests be reported to the public health agency by the laboratory performing such tests. The rule has subsequently been renumbered due to reorganization and is now designated 19CSR 20-20.080. ■

Year 2000 Communicable Disease Goals

The Missouri Department of Health Strategic Plan for the Year 2000, published January 1987, anticipates that a system of communicable disease controls, including the provision of diagnostic testing services, will be in place to reduce the incidence of communicable diseases. It is expected that each reported case of measles, rubella, diphtheria, mumps, syphilis, chlamydia, and resistant gonorrhea will be investigated for the purpose of implementing effective control measures.

Specific objectives for reducing the incidence of some diseases were included as follows (expressed per 100,000 population):

- Gonorrhea	**from 398 to 244**
- Chickenpox	**from 50 to 25**
- Food-borne illness	**from 14 to 11**
- Giardiasis	**from 9 to 7**
- Tuberculosis	**from 6 to 3**
- Haemophilus inf. b	**from 2 to 1**
- Hepatitis A	**from 2 to 1**

These decreases will require cooperation between attending physicians and public health agencies. The initial development when **increased** attention is focused on a disease is an **increased** incidence due to more reporting as physicians increasingly realize the need for reporting. This may well lead in turn to eventual reduction with more complete application of available preventive measures.

The annual incidence of AIDS was two per 100,000 in 1986. It was projected that the incidence might well increase to 10 per 100,000 by 1990 and be reduced to seven per 100,000 by the year 2000. In 1988 the estimated incidence of AIDS was 8.6 per 100,000. At the current rate of increase it is possible that the estimate for 1990 will be exceeded.

The projected decrease in chickenpox is predicated on a vaccine which has not yet been approved. The improved vaccine for *Haemophilus influenzae b* has been well received and should facilitate reaching the goal. Hepatitis A has increased with outbreaks in several parts of the state and reluctance on the part of some practitioners to use the highly effective immune serum globulin due to unjustified concern that this biological might transmit HIV.

TB increased in 1986 and 1987 but resumed its downward trend in 1988. Giardiasis increased in 1987 and gonorrhea increased slightly in 1988. It will require much effort to reach these goals by the year 2000. ■

The Importance of Disease Surveillance

Surveillance, a constant observational study, involves monitoring of disease occurrence and is critical in the fields of public health and preventive medicine. Physicians often fail to report important infectious diseases inspite of the state law. The benefits of prompt reporting can lead to distinct intervention methods as evidenced in the following case report.

"On July 19, 1988 an individual presented himself to a Missouri hospital with symptoms associated with a foodborne illness. This individual indicated that four other persons were ill and all had eaten at a local restaurant the evening of July 16. A nurse at the hospital immediately notified the local health department of the possibility of a foodborne outbreak and an investigation was initiated including interviewing the exposed restaurant patrons and employees, inspecting the restaurant, and collecting food, water and stool specimens.

Forty-seven patrons were interviewed and 38 were identified as outbreak-related cases. Three of the food samples obtained at the restaurant tested positive for *Salmonella enteritidis, ssp. virchow.*

Inspection of the restaurant and interviewing employees revealed improper storage, preparation, and handling of food items as well as improper temperature controls and poor sanitation practices. A closing order was issued to the restaurant on July 21 and the restaurant has not reopened.

This restaurant was one of the largest food service facilities in the area and had served approximately 400-500 persons on July 16. Prompt reporting of a suspect foodborne illness was instrumental in preventing additional cases which could have occurred had the source not been identified and improper food handling and sanitation procedures halted."

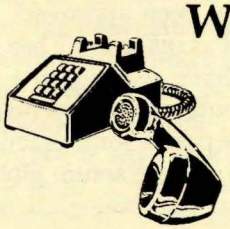
Disease surveillance and reporting can be accomplished in several ways. In addition to relying on private physician reports, laboratories should report positive test results for selected diseases to local health agencies. Hospital infection control practitioners may be one of the first health authorities aware of a case of infectious disease and are depended upon to report to public health officials. Special studies and sentinel systems are developed by public health agencies to monitor the occurrence of diseases in the community i.e., schools, day-care establishments and public health clinics.

"It is the epidemiologists' function to get the facts to the decision makers. Good surveillance does not necessarily ensure the making of the right decisions, but it reduces the chances of wrong ones."

Alexander D. Langmuir MD
Harvard's Cutter Lecture on Preventive Medicine,
May 16, 1962

Additional information regarding reporting and surveillance can be found in "Why Report Contagious Diseases?", The New Physician/Number 7/1983, written by Dr. Robert G. Harmon, Missouri State Health Officer while he was Director of Public Health for Maricopa County, Phoenix, Arizona. ■

Who Do you Call...



Disease Prevention consultation	314/751-6128
Communicable Disease consultation	314/751-6113
Veterinary Public Health/zoonotic	314/751-6136
Immunization information	314/751-6133
STD information	314/751-6141
TB information	314/751-6122
AIDS information HOTLINE	800/533-AIDS
or AIDS Prevention	314/751-6438
Community Sanitation consultation	314/751-6090
Radiological Health information	314/751-6083
Environmental Epidemiology	314/751-6102
Occupational Health inquiries	314/751-6102

Environmental Health and Epidemiology
Toll-Free 800/392-0272

Reporting Procedures for Communicable Diseases

DOH Rules **19CSR 20-20.020** and **19CSR 20-20.080** designate the diseases, disabilities and conditions that must be reported to the DOH. The rules also establish who should report, how to report, and when to report. The following is a summary of those rules.

Who Must Report

Physicians - A physician attending any person who is suffering from, suspected to be suffering from, or a carrier of any of the specified diseases or conditions.

A physician attending any patient, with any of the specified diseases or conditions, who is in a hospital, clinic or other private or public institution may authorize, in writing, the chief executive officer or designee of the hospital, clinic or institution to submit reports of reportable diseases on patients attended by the physician at the hospital, clinic or institution. But under no other circumstances shall the physician be relieved of this reporting responsibility.

A physician's report of epidemics shall include the diagnosis or principal symptoms, the approximate number of cases, the local health authority jurisdiction within which the cases occurred and the name and address of the reporting physician.

Laboratories - The director or person in charge of any laboratory shall report the result of any test that is positive for, or suggestive of, any of the specified diseases or conditions.

Other - Any person in charge of a public or private school, summer camp or day care center shall report immediately to the local health authority the presence or suspected presence of any of the designated disease or conditions.

Category I Diseases

Animal bites
Botulism
Chlamydia trachomatis infections
Diphtheria
Epidemics - foodborne, toxic sub. and others
Gonorrhea
Measles
Meningitis, Haemophilus influenzae
Meningitis-Meningococcal
Poliomyelitis
Rabies
Rubella
Syphilis
Typhoid Fever

Category II Diseases

Acquired Immune Deficiency Syndrome (AIDS)
Amebiasis
Anthrax
Brucellosis
Campylobacter infections
Chancroid
Chickenpox
Cholera
Disease due to mycobacteria other than tuberculosis (MOTT)
Encephalitis, infectious
Encephalitis, viral
Genital herpes
Giardiasis
Granuloma inguinale
Hepatitis A, B and non-A, non-B
Histoplasmosis outbreaks
Human Immunodeficiency Virus (HIV) seropositivity (confirmed)
Influenza outbreaks
Kawasaki disease
Legionellosis
Leptospirosis
Listeria monocytogenes
Lymphogranuloma venereum
Malaria
Meningitis, aseptic
Mumps
Nongonococcal urethritis
Nosocomial outbreaks
Pediculosis outbreaks
Pertussis
Plague
Psittacosis
Reye Syndrome
Rocky Mountain spotted fever
Salmonella infections
Scabies outbreaks
Shigella infections
Tetanus
Toxic Shock Syndrome
Trichinosis
Tuberculosis
Tularemia
Yersinia enterocolitica

All morbidity reports are confidential records and not public records

What, When and How To Report

Category I diseases, illness in a food handler, and epidemics or outbreaks, must be reported to the local health authority or DOH (1-800-392-0272) within 24 hours of suspected diagnosis by telephone, telegraph or other rapid communications, followed by a written report [see Disease Case Report card (CD-1) below] within seven days.

MISSOURI DEPARTMENT OF HEALTH
DISEASE CASE REPORT ***SEND TO LOCAL HEALTH UNIT***

DISEASE FORM TYPE OR CLASSIFICATION	DATE OF REPORT ▶ MON DAY YR
PATIENT'S NAME (LAST FIRST MI)	DATE OF ONSET ▶ MON DAY YR
PARENT'S NAME (IF NOT ADULT)	DATE OF DIAGNOSIS ▶ MON DAY YR
ADDRESS (STREET NUMBER)	DATE OF BIRTH ▶ MON DAY YR
CITY COUNTY STATE ZIP	AGE ▶ SEX ☐ MALE ☐ FEMALE ☐ UNKNOWN
PATIENT'S PHONE / ATTENDING PHYSICIAN	RACE ☐ 1-WHITE ☐ 2-BLACK ☐ 3-HISPANIC ☐ 4-
LAB FINDINGS	OTHER DEATH ☐ YES ☐ NO
WAS PATIENT HOSPITALIZED? ☐ YES ☐ NO / RESIDE IN NURSING HOME? ☐ YES ☐ NO	NOSOCOMIAL INFECTION? ☐ YES ☐ NO
NAME OF HOSPITAL/NURSING HOME	ADDRESS

MO 580-0779 (11-87) PLEASE COMPLETE OTHER SIDE CD-1 (R11-87)

Category II diseases must be reported on the CD-1 within seven days of suspected or established diagnosis.

NOTE: An exception to the timing of reports is made for persons who are responsible for groups of children in settings such as public or private schools, summer camps or day care centers. These persons are obligated by law to **IMMEDIATELY** report the presence of any designated disease or condition.

When submitting the CD-1, include all information as indicated. Please contact your local health department or the Bureau of Communicable Diseases for a supply of Disease Case Report cards.

All morbidity reports received by a local health authority or the Department of Health are confidential records and not public records. ■

Reporting Nosocomial Outbreaks Leads to Epidemiologic Consultations

The Nosocomial Infection Control Program is dedicated to the goal of assisting hospitals and nursing homes to reduce nosocomial infections. The Program serves as a resource to infection control practitioners (ICP) who need information about specific infections as well as prevention and control measures. The Program can assist the ICP in assessing whether a nosocomial infection rate represents endemic or outbreak level of infection.

Reports of nosocomial outbreaks should be made to the local health agency or the Nosocomial Infection Control Program. Diseases listed in 19CSR 20-20.020 must be reported to the local health agency because of their implications for community control measures.

DATA COLLECTION

Information needed for outbreak reporting

1. Where outbreak occurred:
   Facility's name and address
   Service (long term care, intensive care, newborn nursery, medical, pediatrics, obstetrics, surgical)
2. Date of onset of first case
3. Suspected/diagnosed illness or principal symptoms; established case definition
4. Number of cases
5. Reporting physician or facility and address
6. Name and telephone number of contact person for more information
7. Control measure(s) instituted

Additional data listed below would be helpful:

1. Organism(s) causing the infection along with specimen collection date. Hold specimens for further study
2. Age and sex of cases
3. If employees, occupations or work location of cases; if patients, floor or room numbers of cases
4. Dates of onset of subsequent cases
5. Site of infections (e.g., urinary tract, surgical wound, respiratory, bacteremia, skin, gastrointestinal)
6. Hypothesis: Any common intervention technique performed on patients or any possible reservoir as a source, along with dates of exposure and best guess as to mode of transmission

When there have been no additional cases within the last incubation period, the facility should evaluate and document the following:

1. The infection control measures that worked
2. Whether new cases occurred since the last report (verify the total number of cases)
3. The most probable reservoir and mode of transmission

Should assistance be needed in identifying or managing an outbreak, the facility may call the local health unit or the Nosocomial Infection Control Program (314) 751-6115 or (800) 392-0272. ■

Importance of Reporting

Sexually Transmitted Diseases (STD)

1. Prompt sexually transmitted disease case reporting is important in preventing the spread of infection. Case reports are utilized to determine the extent of the STD problem in a specific area of the state. Reporting is the greatest ally of control efforts, enabling the health department to provide epidemiologic follow-up or disease intervention without delay. Failure to report or slow reporting allows the disease to spread and requires extra disease intervention time.

MISSOURI DEPARTMENT OF HEALTH
CONFIDENTIAL MORBIDITY REPORT FOR SEXUALLY TRANSMITTED DISEASES

PATIENT'S NAME	AGE / SEX
PARENT'S NAME IF NOT ADULT	DATE OF BIRTH
ADDRESS CITY COUNTY STATE	RACE ☐ 1 White, not Hispanic ☐ 2 Black, not Hispanic ☐ 3 Hispanic ☐ 4 Asian or Pacific Islander ☐ 5 Am. Indian or Alaskan Nat
TREATMENT	**TREATMENT NOT INDICATED**
DATE OF PRESENT TREATMENT / DATE OF TEST	☐ PREVIOUS ADEQ TREATMENT ☐ FALSE POSITIVE
KIND & AMOUNT OF R_x	PRES. DISEASE STAGE / DATE OF PREV TREAT
☐ NO TREATMENT / HOSPITALIZED ☐ YES ☐ NO	PLACE
ATTENDING PHYSICIAN	DATE OF REPORT
ADDRESS	☐ CHECK HERE FOR ADDITIONAL CARDS

INDICATE DIAGNOSIS ON REVERSE SIDE CD-1A (R5-88)

2. Every diagnosed STD should be reported on a CD-1A. Each question should be answered thoroughly, legibly and accurately to permit the health department to evaluate the report accurately. If additional information is needed, the private physician is contacted prior to contacting the patient.

3. Confidentiality of morbidity case reports is assured by health department regulations.

Tuberculosis

Cases of tuberculosis, as well as any mycobacterial disease, are reported in Missouri on an "Individual Tuberculosis Report Card (TBC-3)". These 3 1/2" x 5" yellow cards are provided by the Missouri Department of Health through the local health agency.

INDIVIDUAL TUBERCULOSIS REPORT — **MO. DEPARTMENT OF HEALTH**

NAME (LAST) (FIRST) (MIDDLE) — H.D. NUMBER
STREET — DATE OF BIRTH
CITY COUNTY STATE — MONTH / DAY / YEAR
RACE* ☐ White ☐ Amer. Ind. or Alaskan Native ☐ Black ☐ Asian or Pacific Islander — ETHNIC ORIGIN* ☐ Hispanic ☐ Not Hispanic — AGE — SEX ☐ M ☐ F

CURRENT CHARACTERISTICS

1. **TUBERCULOSIS DISEASE:** ☐ YES ☐ NO If Yes, check predominant site below ☐ Reported at time of death
☐ Pulmonary ☐ Lymphatic ☐ Genitourinary ☐ Meningeal
☐ Pleural ☐ Bone and/or Joint ☐ Miliary ☐ Peritoneal ☐ Other (Specify)
Significant site(s) other than predominant site: _____

2. **BACTERIOLOGY:** ☐ Not done

TYPE TEST	Positive	Negative	Pending
Smear	☐	☐	☐
Culture	☐	☐	☐
Not stated	☐	☐	☐

If culture Positive ☐ MTb or ☐ Other Mycobacterium (Specify) _____

3. **CHEMOTHERAPY:** ☐ Not on chemotherapy
☐ On chemotherapy since (date) _____
☐ One drug
☐ Two or more drugs

MEDICATION AND DOSAGE				
INH	RIF	EMB	PZA	OTHER

MO 580-0835 (1-86) *Both Race AND Ethnic Origin should be indicated (See Reverse) TBC-3 (R1/86)

4. **PREVIOUS TREATMENT FOR TUBERCULOSIS DISEASE:** ☐ YES ☐ NO ☐ UNKNOWN

5. **X-RAY:** ☐ NORMAL ☐ ABNORMAL ☐ NOT DONE
☐ Stable ☐ Cavitary
☐ Worsening ☐ Noncavitary
☐ Improving

6. **TUBERCULIN TEST:** ☐ POSITIVE ☐ NEGATIVE _____ MM OF INDURATION ☐ NOT DONE

REPORTED BY: — TELEPHONE NO. — DATE OF REPORT
Name: _____
Address: _____
COMMENTS:

TBC-3 (R1/86)(BACK) AN EQUAL OPPORTUNITY/AFFIRMATIVE ACTION EMPLOYER services provided on a nondiscriminatory basis

This card was developed in order to obtain necessary clinical information unique to tuberculosis and other mycobacterial diseases. In addition to the demographic information requested, space is available to indicate complete clinical data regarding the episode of disease. Information is requested regarding:

1) Site of disease
2) Bacteriologic and radiographic findings
3) Tuberculin status of the patient
4) Patient's prior history of disease, if any.

In addition to providing data to be used in analyzing incidence trends, this information regarding detailed clinical aspects of disease will allow the local and state health agency to determine the type and extent of epidemiologic response to be made upon receipt of the morbidity report.

MISSOURI MORBIDITY AND MORTALITY REPORTS OF SELECTED COMMUNICABLE DISEASES - 15 YEAR REPORT

	1988	1987	1986	1985	1984	1983	1982	1981	1980	1979	1978	1977	1976	1975	1974
AIDS	403	239	91	52	28	6	1	-	-	-	-	-	-	-	-
Amebiasis	30	27	26	28	44	45	11	28	15	29	20	10	12	14	10
Brucellosis	4	14	4	12	7	4	4	4	3	6	3	9	4	4	5
Campylobacter	441	260	281	304	260	166	115	78	49	-	-	-	-	-	-
Chickenpox	11350	8595	5093	2474	2565	408	637	880	2331	3510	4048	4246	6051	7633	4423
Chlamydia	6239	2944	1532	412	9	-	-	-	-	-	-	-	-	-	-
Diphtheria	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0
Encephalitis, Inf.	8	11	13	12	11	28	16	10	13	16	16	11	129	82	73
Giardiasis	654	690	516	458	462	216	235	113	77	72	-	-	-	-	-
Gonorrhea	17241	16491	19029	20023	20042	20750	21269	22249	21640	21395	23029	21126	21281	18346	16170
Hepatitis A	897	560	126	98	138	123	204	282	254	392	552	504	560	542	425
Hepatitis B	639	460	420	359	297	365	297	307	205	267	231	233	196	254	144
Unspecified	21	21	15	24	46	87	95	214	176	189	192	205	242	220	186
Non A, Non B	50	46	39	42	18	33	24	(These years are added into Hepatitis Unspecified)							
Influenza	148	69	78	61	39	140	153	225	16881	18647	25688	29178	28449	44367	53350
Malaria	6	8	12	5	8	4	10	4	16	6	10	23	9	10	1
Meningitis, Asep.	124	163	172	156	95	277	156	178	116	130	-	-	-	-	-
Meningitis, H. Flu	138	131	172	108	104	86	66	-	-	-	-	-	-	-	-
Meningitis, Meng.	33	35	40	46	53	55	40	45	42	38	42	29	51	58	49
Meningitis, Other	64	75	123	47	51	276	156	122	127	94	92	89	122	93	87
Mumps	68	38	23	18	11	21	13	40	103	203	1211	2421	962	1027	1755
Pertussis	25	46	32	35	23	24	17	24	30	24	45	31	19	21	25
Polio, all forms	1	0	0	1	0	2	0	1	0	1	0	0	0	0	0
Rabies Animal	36	59	75	59	70	96	123	243	379	307	95	60	75	50	41
RMSF	54	26	25	10	14	14	10	23	31	31	29	19	18	16	9
Rubella	0	0	1	7	0	0	38	2	45	73	118	93	139	758	180
Rubeola	65	190	32	5	6	1	2	1	67	436	154	1055	468	251	268
Salmonellosis	772	660	728	690	617	602	571	700	589	602	488	418	407	440	474
Shigellosis	607	471	89	143	244	264	67	268	129	258	443	406	157	172	472
Syphilis, Total	473	328	494	578	712	801	1069	1397	1051	896	1573	1728	1715	3762	3619
Primary & Second.	154	90	110	133	186	145	296	394	163	139	144	172	353	277	416
Tetanus	1	1	2	3	6	1	1	1	2	1	2	4	2	2	7
Tuberculosis	275	339	338	311	354	399	390	432	466	500	456	497	568	550	564
Tularemia	45	58	32	35	40	51	27	28	26	21	21	26	28	17	20
Typhoid Fever	3	7	6	6	6	10	4	9	20	8	7	14	4	6	4
Yersinia	30	10	6	2	3	1	-	-	-	-	-	-	-	-	-

Reporting Environmental and Occupational Diseases

John R. Crellin, Ph.D., Consultant Epidemiologist

The rule on communicable disease (19 CSR 20-20) requires that physicians report diseases or illness related to a toxic or radioactive substance exposure. Section (3) of 19 CSR 20-20.020 requires that diseases or illnesses be reported to the local health authority or DOH within 24 hours if they represent a serious threat to public health or safety. This report is to be followed with written notice within seven days. Laboratories are required to report the results of tests which are either positive or suggestive of environmental or occupational disease (19 CSR 20-20.080).

Specific diseases or illnesses which must be reported are: silicosis, asbestosis, byssinosis, mesothelioma, and pesticide poisoning. However, reporting is also required of any other disease or illness resulting from exposure to a toxic or radioactive substance indicative of an occupational, environmental, or public health problem. Reports of occupational- or environmental-related disease from physicians should include the same information as reports of communicable disease: the patient's name, address, age, sex, and race; the disease diagnosed or suspected; and the date of diagnosis. Reports from laboratories should include: name, age, sex and race of patient; test performed and results;date test performed; and name and address of attending physician.

Because of the growing concern about diseases linked to the environment and workplace, theDOH is currently revising the occupational/environmental portions of the reporting rule. These revisions will include additional specific diseases or illnesses, a list of specific laboratory results to be reported, and a description of what DOH's duties are to control and prevent further occurrence through follow-up.

Contact the Bureau of Environmental Epidemiology at P.O. Box 570, Jefferson City, 65102 or (314)751-6102 if you are interested in receiving more information on reporting occupational and environmental disease. ■

Reporting Human Immuno-deficiency Virus (HIV) Infection

Jim McDonald/Elaine Colvin, Bureau of AIDS Prevention

Confidential reporting of HIV seropositivity was required on October 25, 1987 as a part of the general communicable disease reporting rule (19CSR 20-20.020) and by state statute on June 1, 1988. HIV reporting is a dual responsibility of both the attending physician and the testing laboratory. Special coded forms have been developed for both physicians and private laboratories to use for reporting. These are outlined below:

PHYSICIAN HIV ANTIBODY TEST REPORT

This form is used by physicians/clinics to report receipt of confirmed HIV-positive test results on each patient from the testing laboratory. The attending physician or his designee should fill out this form completely including name and address of patient, unique patient identifier (number or name assigned by the physician and used to identify the specimen to the testing laboratory), risk factor information, name and address of testing laboratory and submitting physician. After completion, the top (white) copy should be retained by the physician for his records and the second (yellow) coded copy should be mailed to:

Missouri Department of Health-BAP
1730 E. Elm St., P.O. Box 570
Jefferson City, MO 65102

Note: The yellow copy includes no HIV patient identifiers. This assures the confidential nature of patient information during mailing.

Blank Physician HIV Antibody Test Report forms (BAP-2) are available from the Bureau of AIDS Prevention (BAP) Surveillance Unit at the above address (ph: 314/751-6463) or from your local district health unit.

"The importance of surveillance in the control of HIV infection is absolute. Public Health officials must recognize that passive and anonymous surveillance is a poor substitute for the aggressive public health approach necessary to save lives today instead of at some nebulous point in the future."

Theodore Northup, Chief
Bureau of AIDS Prevention
Missouri Department of Health

Laboratory HIV Antibody Test Report

Private testing laboratories use this form to report confirmed reactive results [repeatedly reactive ELISA in conjunction with a reactive supplemental test (e.g., Western Blot)]. Laboratories report using the unique patient identifier used by the physician to identify the specimen to their laboratory. Forms must be filled out completely including name and address of testing laboratory and submitting physician. After completion the top (white) copy should be retained by the laboratory for their records and the second (blue) copy should be forwarded to:

Missouri Department of Health-BAP
1730 E. Elm St., P.O. Box 570
Jefferson City, MO 65102

All HIV lab results should be reported to the physician using the currently established system in place with that particular physician.

HIV Antibody Test

An HIV Antibody Test request form (Lab 45) is used by physicians/clinics to request HIV testing from the Department of Health (DOH) Public Health Laboratory. The state laboratory performs HIV testing (ELISA and Western Blot) free of charge. Each specimen should be identified only by the patient ID number pre-stamped on the request form. The state lab will not process a blood specimen with the patient's name attached, or without the prestamped, confidential identifier. This number assigned to each specimen is the unique patient identifier to be used by physicians in reporting seropositive patients tested by the state laboratory. A Physician HIV Antibody Test Report form and pre-addressed envelope is returned to the submitting physician with each confirmed positive test result for his convenience in reporting HIV seropositive patients. The state laboratory reports confirmed positive results to BAP using the unique pre-stamped patient identifier. HIV Antibody Test request forms and test kits are available from:

State Public Health Laboratory
307 W. McCarty
Jefferson City, MO 65101
phone 314/ 751-3334

An HIV reactor follow-up program is being implemented to contact physicians and laboratories who do not report promptly or submit forms with incomplete data.

Missouri Department of Health
Laboratory HIV Antibody Test Report

State rule requires that this form be completed within seven (7) days of receipt of a confirmed reactive HIV serologic test.

1. Patient Identifier ▶	7. TEST PERFORMED	N	E	R
	ELISA			
2. Date Drawn ▶ / 3. Date Tested ▶	Western Blot			

4. Previous Test Results (Date ▶

5. Physician Data ▶ (Name

Phone

6. Laboratory Data ▶ (Name

Type or Print (Do Not Use Rubber Stamp)

MO 580-0498 (11-

HIV ANTIBODY TEST

PATIENT ID NUMBER	DATE DRAWN
255755	

PROVIDER TYPE — PROVIDER CODE ▶

☐ HEALTH DEPT. ☐ CATS ☐ STD
☐ PRISON/JAIL ☐ PRENATAL ☐ OTHER:
☐ FAMILY PLANNING ☐ COMP. H.C. _____
☐ SUBSTANCE ABUSE ☐ PVT. PHYS.

BOX A: ATTENDING PH

PHONE ▶

BOX B: NAME AND ADI
RETURN ADDR
SENT TO THE S

MISSOURI DEPARTMENT OF HEALTH
STATE PUBLIC HEALTH LABORATORY
ERIC C. BLANK, Dr. P.H., DIRECTOR
307 W. McCARTY STREET
JEFFERSON CITY, MO 65101

HS

MO 580-0907 (12-88)

MISSOURI DEPARTMENT OF HEALTH
PHYSICIAN HIV ANTIBODY TEST REPORT

SEE INSTRUCTIONS ON REVERSE OF WHITE COPY

State Rule requires that this form be submitted within seven (7) days of receipt of a confirmed reactive HIV Serologic Test.

1. PATIENT IDENTIFIER
2. PATIENT'S NAME
ADDRESS (APT. NO., STREET, P.O. BOX)
(CITY, STATE, ZIP)
TELEPHONE ( )
3. LABORATORY NAME, ADDRESS, TELEPHONE
4. PHYSICIAN NAME, ADDRESS, TELEPHONE
5. DATE TESTED
6. DATE OF BIRTH (MM/DD/YY)
7. CURRENT AGE (YEARS)
8. SEX [M] [F]
9. RACE [W] [B] [H] [A] [I] [OT]

13. SEXUAL EXPOSURE SINCE 1978 TO:

	YES	NO
A. Person with: AIDS	☐	☐
B. ARC	☐	☐
C. Reactive Ab	☐	☐
D. IV drug user	☐	☐
E. Hemophiliac	☐	☐
F. Male prostitute	☐	☐
G. Female prostitute	☐	☐
H. Homosexual/ bisexual man	☐	☐
I. Other _____	☐	☐
15. PREGNANT	☐	☐

10. DATE OF REPORT
11. TEST RESULTS
ELISA [R] [N]
W. BLOT [R] [N] [E] [ND]
OTHER ☐ IFA ☐ OTHER ▶ [R] [N] [E]
12. SYMPTOMS [Y] [N]

14. HAS PATIENT SINCE 1978:

	YES	NO
A. Donated blood/ plasma/sperm/ organs	☐	☐
B. Practiced prostitution	☐	☐
C. Rec'd treatment for Hemophilia	☐	☐
D. Used IV drugs	☐	☐
E. Received blood/ blood products	☐	☐
F. Other _____	☐	☐
16. Perinatal transmission	☐	☐

MO 580-0497 (11-88) PHYSICIAN COPY - RETAIN FOR YOUR RECORDS BAP-2 (R11-88)

Mark all envelopes "Confidential—To be Opened by Addressee Only."

or submit forms with incomplete data.

If a physician report is not received within three weeks after receipt of the reactive laboratory report, the physician will be contacted and asked to report (a weekly schedule is planned). Testing laboratories will be contacted in the same manner.

Consultation in conjunction with HIV testing is appropriate and mandated by Missouri state law. Consequently, the state laboratory request form has been revised to collect demographic and risk factor data on all persons tested to assist in determining if consultation has occurred. This information will be monitored and contact will be made with those providers who do not appear to be providing pre-test consultation.

AIDS Case Reporting

Patients who meet the criteria for a CDC-defined AIDS case are reportable separately from the HIV reporting system. AIDS became a Category II reportable disease in Missouri effective June 20, 1983 (19CSR 20-20.020). Procedures for reporting an AIDS case are as follows:

A diagnosis of AIDS must be made by the attending physician(s) based upon the Centers for Disease Control (CDC) case definition, revised 8/87. For reporting purposes a case of AIDS is defined as an illness characterized by one or more of the "indicator" diseases depending on the status of laboratory evidence of HIV infection. Copies of the case definition are available from the Missouri Department of Health Bureau of AIDS Prevention (Ph: 314/751-6463).

Reports are to be completed by the physician/clinic or his designee (e.g., infection control practitioner, nurse, medical records librarian, etc.) utilizing the AIDS Confidential Case Report Form for adult cases (CDC 50.42A) or pediatric cases <13 years of age (CDC 50.42B). Case report forms may be obtained from the Bureau of AIDS Prevention (BAP) at the address listed below or by calling 314/751-6463.

Completed case report forms (all three copies) should be forwarded directly to the Missouri Department of Health Bureau of AIDS Prevention or through the Kansas City or St. Louis Metro AIDS programs, as applicable, for reporting sources in those areas. Patient name and address should be indicated on the "Patient Information Form" along with other requested information and mailed in a separate envelope from the case report form to protect patient confidentiality during the mailing process. Do not indicate the patient's name or address on the case report form. Date of birth and reporting facility should be identified on both the patient information form and confidential case report form to allow BAP to accurately match the two forms.

The AIDS Confidential Case Report forms (CDC 50.42 A & B) are designed to collect in a confidential manner, information that will lead to a better understanding of and ability to control the spread of AIDS. Instructions for completing the forms are provided on the reverse side of the form for items that may need clarification.

Case report forms or questions regarding reporting should be addressed to:

Missouri Department of Health
B.A.P.
P.O. Box 570, 1730 E. Elm St.
Jefferson City, MO 65102
(PH: 314/751-6463)

St. Louis City Health Division
Attn: Daniel Claverie
634 N. Grand, Suite 436
St. Louis, MO 63103
(PH: 314/658/1159)

Kansas City Health Department
Communicable Disease Division
1423 E. Linwood
Kansas City, MO 64109
(PH: 816/923-2600)

Patient confidentiality is our highest priority. All information is kept strictly confidential by state statute. Access to information is strictly limited to authorized personnel only. The name of the patient is not forwarded to CDC. As an additional safeguard "AIDS" is not used as part of the mailing address on the envelope. All envelopes should be marked "Confidential—To Be Opened By Addressee Only." ■

State Public Health Laboratory Discontinues Certain Serologic Tests

The May-June 1988 issue of Missouri Epidemiologist contained a list of serologic tests which were being discontinued because of low volume of samples, commercial availability of tests, lack of specificity of the test and/or the expense of the reagent. Effective May 1, 1989, chlamydia serology was added to that list. Below is a complete listing of discontinued serologic tests at the State Public Health Laboratory (SPHL). If you have questions, please call the SPHL at 314/ 751-3334.

Fungal antibody screen (histoplasmosis, blastomycosis, coccidiomycosis, aspergillosis, cryptococcosis)
Chlamydia serology
Amebiasis serology
Legionella serology
Leptospirosis serology
Febrile agglutinations (serologies for brucellosis and tularemia)
Cytomegalovirus (CMV) serology
PPLO (Mycoplasma pneumoniae) serology
Varicella (chickenpox) serology
Respiratory syncitial virus (RSV) serology
Adenovirus serology
Parainfluenza serology (three serotypes)

Missouri EPIDEMIOLOGIST

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Missouri Department of Health
Division of Environmental Health
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Jefferson City, MO 65102-0570
Telephone: (314) 751-6080
Toll-free No.: 800-392-0272

Missouri
EPIDEMIOLOGIST

SPECIAL AIDS ISSUE *January-February 1989*

AIDS LEGISLATION

The Missouri AIDS (Acquired Immune Deficiency Syndrome) Law (House Bills No. 1151 & 1044) enacted in 1988 marks a significant advance in the state's effort to contain the AIDS epidemic. This legislation, one of the first and most comprehensive AIDS laws of any state, clearly and objectively addresses AIDS as a public health crisis. The law incorporates legal and social concerns as well as sound public health measures for containing the AIDS epidemic. The law is summarized here.

Regulation of Laboratories and Testing–

The AIDS law offers safeguards to Missourians through the regulation of anti-HIV serological testing at all laboratories other than those in hospitals currently regulated under Chapter 197, RSMo.

Regulation of Testing, Counseling, and Reporting by Name–

The Missouri AIDS law recognizes counseling as a vital part of the anti-HIV testing process. Case identification and subsequent counseling of infected individuals are sound, effective measures used by public health for many years in the control of communicable diseases such as tuberculosis, syphilis, and gonorrhea.

Protection of Confidentiality–

This law is consistent with the long standing Department of Health policy that confidentiality is paramount. It provides legal safeguards for infected individuals and rightfully extends the burden to protect confidentiality to society as a whole.

Anti Discrimination–

This law calls for swift implementation of legal safeguards to protect against discrimination of people with AIDS.

Education Plans and Programs–

This law mandates comprehensive (age and group-specific) educational and public awareness programs.

AIDS and Insurance–

This law helps regulate testing done by insurance companies; it guarantees coverage to people with AIDS who had previous coverage; and it safeguards confidentiality.

Noncompliant Individuals–

This law provides for the management of noncompliant individuals in the few instances where this may be necessary.

Care Coordination–

This law requires a report to the General Assembly detailing the form and impact of health care plans developed for Missourians stricken with AIDS.

Report to the General Assembly–

This law mandates a regular report to the General Assembly.

Premarital Testing–

This law gives the Department of Health authority to promulgate a rule for testing individuals applying for marriage licenses when scientific evidence indicates the need for it.

Anonymous AIDS Testing–

This law calls for three anonymous testing sites, one each in St. Louis, Kansas City, and Springfield.

Partner Notification–

This law mandates partner notification for those people who test HIV positive.

Spread of AIDS Through Establishments–

This law authorizes restrictive measures when there is evidence for their use.

AIDS and Schools–

This law assures that HIV-infected children may continue to be enrolled in school if it is determined that their attendance is not a risk to them or other children.

Sunset Clause–

A sunset clause of this law would cause it to expire on December 31, 1989.

HB1151 & 1044 has been law for eight months. As the process of defining and publishing the various rules required by the law moves forward, health officials continue to laud the insightful and pragmatic considerations that are built into this progressive piece of landmark legislation. ■

INSIDE THIS ISSUE

HIV CARE COORDINATION

The Department of Health (DOH) Eight-Point Plan to combat AIDS addresses the provision of care of HIV-infected individuals as follows: Since most persons with AIDS do not require inpatient medical care for the majority of their illness, a variety of outpatient services and home care utilizing skilled nursing and other services will be required. Hospice services will need to be greatly expanded.

Treatment modalities are beginning to delay the progression of an HIV-infected person to the state of full-blown AIDS — AIDS and HIV-infected patients are living longer. So, in keeping with the 1988 comprehensive AIDS legislation and the Eight Point Plan, and in deference to the reality of the situation, a statewide system of case management is under development. This system is called "HIV Care Coordination." This name was chosen because it is BAP's experience that clients do not like to be called "cases," and BAP doesn't manage care, it coordinates it.

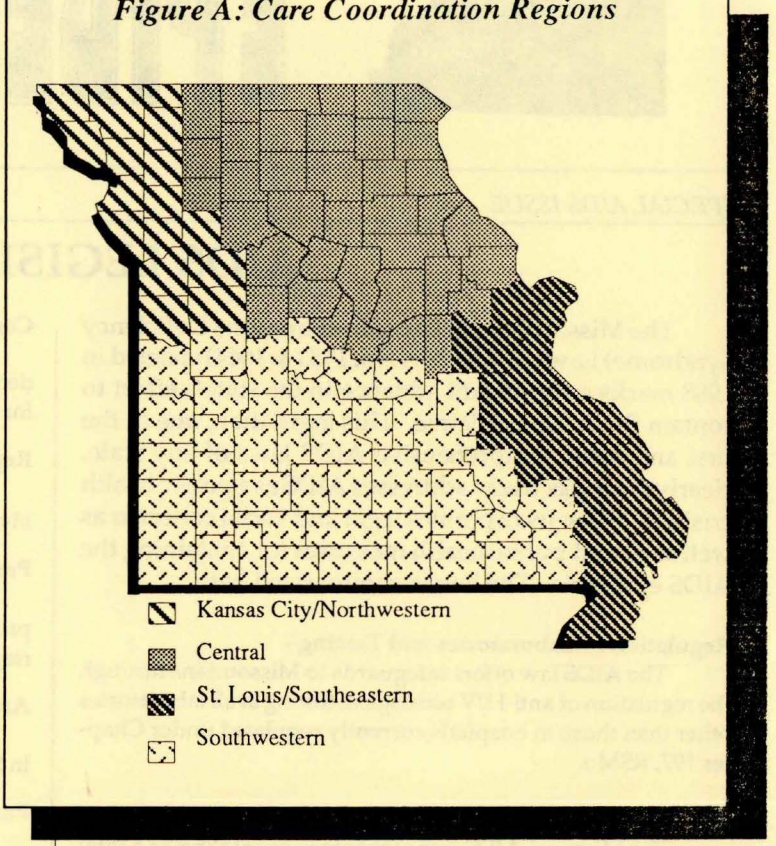
The goals of the HIV Care Coordination system are to:

- ✔ Contain costs
- ✔ Decrease the fragmentation of care across many settings
- ✔ Provide quality care in a timely/consistent manner across a continuum of care
- ✔ Enhance the quality of life for Missouri citizens with HIV-related illness.

Data from across the nation has proven that a system of case management results in significant decreases in the cost of providing care, in addition to preventing duplication of services. Many of those with HIV-related illnesses are "new poor". These individuals and families must deal with terminal illness, stigmatization, loss of jobs and homes and abandonment by friends and family. They need assistance in locating and accessing services such as those provided by the Departments of Social Services and Health. The Care Coordination staff will assist these clients and families in locating and accessing appropriate services at the least restrictive level feasible. Participation in Care Coordination is voluntary. Clients may be referred from their physician, hospital, clinic, community-based organization or self-referred.

HIV Care Coordination will be provided by multidisciplinary teams who are employees of the Bureau of AIDS Prevention (BAP), consisting of Registered Nurses and Clinical Social Workers. These teams will be in four locations, including the areas of Kansas City, St. Louis, Jefferson City and Springfield. Figure A illustrates the geographic areas to be covered by each team. The team located in Jefferson City will have a lower case count because they will be providing some supervisory and administrative functions.

Figure A: Care Coordination Regions



The HIV Care Coordination Program will be piloted in Kansas City in February of 1989. After the pilot, the program will be changed as indicated and implemented on a statewide basis in the spring of 1989. HIV Care Coordination will consist of three levels of care which will be based on the degree of HIV illness:

- ✔ Level I — HIV infection with no illness;
- ✔ Level II — HIV infection with illness but without diagnosis of AIDS;
- ✔ Level III — those meeting the CDC definition of AIDS.

Level I activities will be coordinated with providers of HIV counseling and testing, including the metropolitan AIDS programs and local health departments, to assure the most efficient delivery of a comprehensive program. Level I clients who wish to participate in care coordination will be identified at counseling and testing sites, physicians' offices, clinics or by volunteering for

the program. Care Coordination for seropositive individuals will include education about HIV infection and prevention of disease transmission, referral for a medical evaluation and referral for additional counseling when necessary. HIV counselors are available after the initial contact to provide additional education and support. By identifying and educating seropositive clients, measures can be taken to assist those Missouri citizens in receiving vaccines, for example pneumonia vaccine and drugs that will help them to remain healthy longer. This group should compose the greatest percentage of Care Coordination patients.

Closely linked with the establishment of the care coordination system is the submission of a waiver request to Health Care Finance Administration (HCFA) for a Home and Community-Based Medicaid Waiver for persons with HIV-related illnesses. The waiver would allow Medicaid to pay for services which are not currently included in the State Medicaid plan, such as private duty nursing, counseling, personal care services and residential care. BAP staff are working closely with Department of Social Services (DSS) staff to arrive at a list of services to be included in the waiver which are necessary to reduce or prevent hospital stays. Hospitals, physicians and other providers in the St. Louis and Kansas City areas are working diligently in assisting DOH in collecting resource utilization data. It is anticipated that the waiver request will be submitted to HCFA by April 1, 1989, with a start up date of July 1, 1989. BAP is also developing computer links with DSS necessary for accurate reporting and data collection of waivered services.

Level II and III Care Coordination will be provided by BAP Care Coordination teams. The waivered services will be available to Medicaid-eligible clients at Levels II and III. These services must be prior-authorized by the BAP Care Coordination staff. In order to receive waivered services, clients will need care at the level of a Skilled Nursing Facility, Intermediate Care Facility or hospital.

BAP is currently hiring and orienting staff in all four sites. Staff orientation will consist of an intensive six-week training course with actual providers of services for HIV-infected individuals in the assigned geographic area. The goal of the orientation is for the care coordinators to become experts in the current care and treatment of those with HIV illness so appropriate referrals can be made.

Currently under development are the record system, a comprehensive data collection system and a comprehensive manual that will include standards of care, documentation requirements and quality assurance regarding HIV Care Coordination.

A vital function of the Care Coordination teams will be to conduct health care education for professionals throughout Missouri. Many nursing homes, hospitals, physicians, etc., have not provided care for PWA. There is still much fear and misunderstanding regarding proper procedures. The RNs and social workers will be working closely with the staff members of institutions to assist them in preparing for the care of PWAs. These activities will be coordinated with other BAP educational initiatives targeted toward health professionals. ■

HIV Treatment Program

The drug Retrovir, also known as AZT, prolongs the lives of those with AIDS and advanced AIDS Related Complex (ARC). It reduces the risk and severity of the opportunistic infections associated with the disease. Those who take the drug will gain or maintain weight and are better able to carry out activities of daily living. However, the cost of AZT, approximately $8,000 per year, is beyond the financial reach of many people.

To help alleviate this problem, the Department's Bureau of AIDS Prevention was awarded a $190,000 federal grant from the United States Department of Health and Human Services in September of 1987. The funds were to be used specifically for the provision of anti-HIV medications. The amount of the grant was based upon the rate of reported AIDS cases in the State of Missouri.

The grant is used to reimburse pharmacies for the cost of AZT supplied to individuals who are enrolled in the DOH's HIV Treatment Program. The participant must meet financial criteria established through DOH Rule and not be Medicaid eligible or have coverage by a third party insurance. Additionally, the client must have a prescription for the drug signed by their physician.

Confidentiality of the program participants is a primary consideration in the administration of the program. Information about the participant is never released to the participant's employer, health insurance company, or any other person or entity without the specific written permission of the participant.

HIV Treatment Program Registration and Certification of Eligibility Forms can be requested through the Bureau of AIDS Prevention. The applicant, the applicant's physician, pharmacy, or the applicant's social worker/caseworker may complete the application. The applicant must have his or her physician complete Physician's Statement of Eligibility and provide the DOH with a new prescription every six months for recertification for the program. Documentation of income and eligibility/non-eligibility for Medicaid is also required. If the client has a third party payor which does not cover the cost of the drug, a statement to this effect is required before an applicant is accepted into the program.

In September 1988, an additional $147,000 was awarded the Department of Health, allowing for six-months continuation of the program. To date, 90 people have been served by the HIV Treatment Program and currently 64 people are enrolled. ■

AIDS SURVEILLANCE

Surveillance and epidemiology are tracking and documenting the causes and the spread of a disease. The surveillance and epidemiology program is essential to AIDS prevention. The program monitors the incidence and occurrence of AIDS and HIV infection in Missouri in several ways: 1) active surveillance of AIDS and HIV-related illness; 2) active surveillance of HIV seropositivity; 3) validation studies, such as death certificate and hospital record reviews to assure the completeness of reporting; 4) seroprevalence studies to determine the incidence of infection in the general population and populations at increased risk for infection; and 5) projections of trends of infection and illness over time allowing for the planning of prevention and care programs.

On the local level surveillance data are important in determining populations at risk to assist in targeting counseling and general educational initiatives; to measure incidence trends and the scope of the problem to support funding requests; and to identify individuals who may need and qualify for direct care services.

The importance of surveillance cannot be overstated. For example, surveillance and epidemiology efforts early in the epidemic first identified AIDS as distinct disease, risk factors involved, modes of transmission, morbidity/mortality (death and disease) data and areas of research for causative agents.

DOH's Eight Point Plan to combat AIDS states that monitoring only diagnosed AIDS cases is inadequate. Due to AIDS' long incubation period, diagnosed AIDS cases reflect only the end stage of HIV infection, and, therefore, the level of infection 5 to 7 years ago. To more accurately assess the current levels of HIV infection among Missouri citizens, anti-HIV seropositivity was made reportable in October 1987 as the first step in Missouri's Eight-Point Plan to Combat AIDS. Confidential HIV reporting gives a more complete picture of HIV infection in Missouri. Surveillance of AIDS/HIV infection by patient name is essential for a number of reasons:

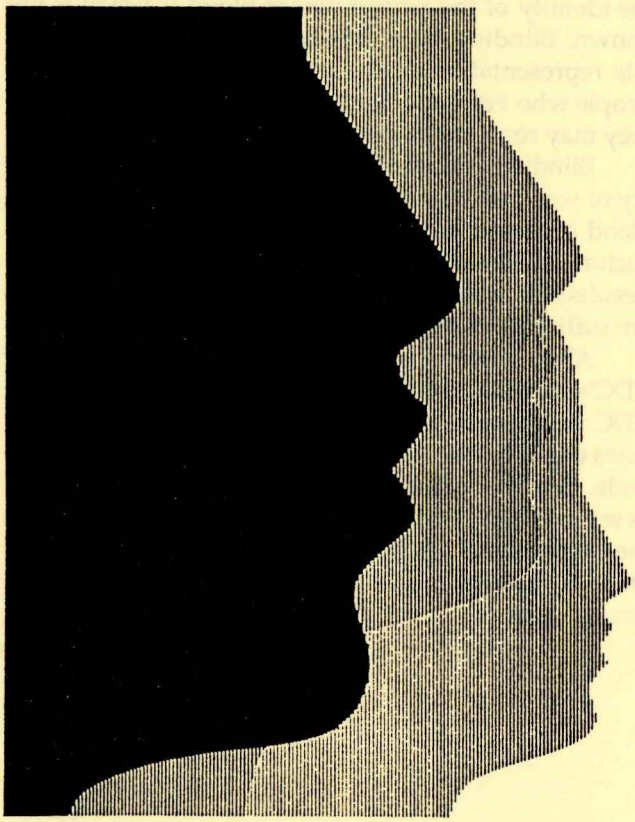
1) Without the identity of the patient, laws that are meant to prevent intentional infection are virtually impossible to enforce.
2) The duty to warn unsuspecting persons who have been exposed and may be infected is implicit in the philosopy of both public and private health care and is particularly important to women of child bearing age.
3) Medical advances relating to HIV infection are occurring so rapidly that infected people may need to be notified quickly of beneficial medications.
4) Messages targeted to individuals who have been infected with or at risk for infection with HIV must be specific and tailored to each person's lifestyle. This type of education is best provided one-on-one.
5) Reported incidence of HIV is validated by assuring duplicate reports are not tabulated.
6) Missouri's Care Coordination Program is supported and enhanced. Individuals reported through the confidential AIDS/HIV surveillance mechanism may be enrolled into the HIV Care Coordination Program.

In the first 12-month period since reporting began on October 25, 1987, a total of 880 HIV seropositives have been reported. Since the first report in 1982 a total of 820 Missouri residents have been reported as meeting the CDC AIDS case definition. Forty-nine percent (403) of those cases were newly reported during 1988. This represents a 68 percent increase over the number of cases reported in 1987. Comparing the number of cases that were estimated for 1988 with the actual number of cases recorded for that year is an indication of the accuracy of the estimations for future case counts. However, health officials take little comfort in the fact that the estimation process works so well when it portends 3,500-5,000 cases in Missouri by the end of 1992.

Patient confidentiality is a very high priority. Confidentiality is a cornerstone of public health and, when assured, evokes confidence and enhances reporting of diseases. It is especially critical in AIDS/HIV reporting. Special AIDS/HIV report forms are utilized to assure patient confidentiality during the reporting process. All computerized and hard copy files are locked and under 24 hour surveillance. Access to confidential records is strictly limited to surveillance staff. Confidentiality safeguards are continually evaluated and enhancements made when applicable. Information is carefully monitored and released only on a need-to-know basis as outlined in the June 1988 legislation.

Reporting of HIV seropositives by patient name is vital to partner notification. To deny persons knowledge of exposure to a potentially life-threatening infection is to censor their ability to make important decisions about their health. Confidential HIV reporting validates information obtained through the contact elicitation process and helps to interrupt the chain of infection. Individuals who are notified through this process and choose to be tested confidentially may be identified as seropositive early in their infection. Early identification of infection may help the person remain healthy longer. ■

Minority Perspectives on AIDS



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SEROPREVALENCE

In order to assess and predict the medical, economic and personal impact the AIDS epidemic will have on Missouri residents, it is necessary to estimate the number of HIV infections in the state. This assessment is called "seroprevalence."

The incubation period of the AIDS virus has been estimated to be as long as 15 years with an average somewhere between five and seven years. This means that people who are infected today may not develop the signs of AIDS infection for many years. Due to this long incubation period, AIDS cases reported today reflect the outcome of HIV infections which occurred several years ago.

The BAP has begun seroprevalence surveys to measure the extent of HIV infections in specific populations throughout the state. These surveys will allow the Department of Health to estimate medical needs for the future, target educational intervention strategies and monitor the course of the epidemic. Seroprevalence surveys are being conducted in the following populations:

- ✔ Clinic patients: tuberculosis, family planning, substance abuse and sexually transmitted diseases.
- ✔ Women attending reproductive health clinics.
- ✔ Neonates born in Missouri.

Most of these surveys will be blinded, which means the identity of the person whose blood is tested is not known. Blinding the studies assures that the sample is a fair representation of the population being tested — people who volunteer for testing aren't chosen because they may represent a group with less risk for infection.

Blinding of these studies is accomplished in a variety of ways and by using what is essentially discarded blood collected for other purposes. Basic information such as sex, age and area of the state is all that is collected. Results of these surveys will become available when data are sufficient to allow analysis, possibly by mid-1989.

Also, Missouri will be a major contributor to the CDC's national family of seroprevalence surveys. The CDC will sample 30 American cities, called "sentinel" cities to predict the prevalence of the AIDS virus nationwide. Both Kansas City and St. Louis have been picked as sentinel cities, in part because of the experiences with the gathering of infection information from the Missouri DOH — through a BAP program called "AIDS Surveillance." ■

Missouri EPIDEMIOLOGIST

Published by the
Missouri Department of Health
Division of Environmental Health
and Epidemiology Services
P.O. Box 570, 1730 E. Elm Street
Jefferson City, MO 65102-0570
Telephone: (314) 751-6080
Toll-free No.: 800-392-0272

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SPECIAL AIDS ISSUE

Missouri EPIDEMIOLOGIST

Special 1988 Annual Summary *July 1989*

Sentinel Active Surveillance System

Douglas R. Dodson, Eastern District Health Office
Mahree Fuller Bright, Bureau of Communicable Disease Control

How do local health agencies and the Department of Health (DOH) gather information about disease incidence that is both *timely* and *accurate*? The process of disease surveillance includes four distinct tasks:

- ✔ data collection
- ✔ consolidation
- ✔ analysis
- ✔ dissemination

Data collection is the most difficult and certainly the most thankless task in this process. The goal is simply defined:

to collect accurate, timely, sensitive data

Accomplishing it is *not* simple, yet the other steps depend on good data.

The passive reporting system has proved to be highly accurate. When a case of hepatitis A is reported, we can be reasonably sure that a case of hepatitis A has actually occurred. We can assure the accuracy of reporting by adhering to commonly accepted case definitions and/or obtaining laboratory confirmation. Passive reporting can, however, be slow. For highly communicable diseases with short incubation periods, this process may not allow timely application of control measures.

To improve the timeliness of reporting at the local level, the Sentinel Active Surveillance System (SASS) has been developed. Sentinel sites include schools, physician offices, clinics, hospitals, and nursing homes throughout the state, as shown in Table 1.

The system is "active" in that local health departments telephone each site weekly to solicit reports. Information from the sentinel sites can alert the health department to an undetected outbreak or reveal the occurrence of an unusual disease, so an investigation can be started as quickly as possible. The data is also useful for tracking disease trends in the community such as seasonal changes in influenza-like illness, chickenpox, and pediculosis.

Cases are frequently reported through SASS before a definite diagnosis has been made. Sites may report signs and symptoms (e.g. gastrointestinal illness, febrile upper respiratory illness) or a suspected diagnosis. Thus, some of the data's specificity is sacrificed to improve timeliness.

The passive and active surveillance systems work in tandem to achieve a high degree of accuracy and to facilitate a timely response to changes in disease incidence. If you are interested in participating in SASS, please call your local health department or the Bureau of Communicable Disease Control at 1-800-392-0272. ■

Inside this Issue

Table 1

Surveillance Reporting Sites

Data as of May, 1989

Central District - 128 sites	
Schools	48
Clinics/Physicians	33
Hospitals	13
Day Care Centers/Preschools	7
Nursing Homes	6
Other	21
Eastern District - 43 sites	
Schools	8
Clinics/Physicians	12
Hospitals	11
Day Care Centers/Preschools	5
Nursing Homes	5
Other	2
Northeastern District - 99 sites	
Schools	42
Clinics/Physicians	31
Hospitals	12
Day Care Centers/Preschools	2
Nursing Homes	10
Other	2
Northwestern District - 71 sites	
Schools	22
Clinics/Physicians	26
Hospitals	14
Day Care Centers/Preschools	2
Nursing Homes	4
Other	3
Southeastern District - 130 sites	
Schools	71
Clinics/Physicians	33
Hospitals	17
Day Care Centers/Preschools	8
Nursing Homes	0
Other	1
Southwestern District - 96 sites	
Schools	34
Clinics/Physicians	27
Hospitals	20
Day Care Centers/Preschools	4
Nursing Homes	8
Other	3
All Districts - 567 sites	
Schools	225
Clinics/Physicians	162
Hospitals	87
Day Care Centers/Preschools	28
Nursing Homes	33
Other	32

Communicable Disease Coordinators

The Communicable Disease Control program will now have coordinators in each district health office. Previously, the Southeastern District was the only area served by a full-time coordinator. The Communicable Disease (CD) Coordinator will oversee surveillance and monitoring activities in the district and provide technical assistance to county health units in all phases of disease investigation and control. The CD Coordinators are:

Southeastern District:
Sue Tippen has worked in the Southeastern District Health Office for 25 years. During the past two years she's served as the CD Coordinator. Prior to that time she served as liaison in the Tuberculosis Control Program. A dedicated traveler, Sue plans to visit Hawaii this summer.

Eastern District:
Douglas Dodson has worked in the Eastern District Health Office as an Environmental Sanitarian for the past ten years. He is a graduate of Southwest Missouri State University with a B.S. in biology. Doug is most willing to answer when the golf course beckons.

Central District:
Harvey Marx: During the past six years Harvey was employed as an Environmental Sanitarian in the Central District Health Office. He has worked in public health for 11 years. As a recently licensed pilot, Harvey may be seen flying the friendly skies of Missouri.

Northwestern District:
C. Jon Hinkle has worked for the Missouri Department of Health for 13 years as an Environmental Sanitarian in the Northwestern District Health Office. He is a graduate of Northwest Missouri State University with a B.S. in Zoology. An avid golfer, Jon is always ready to "tee off."

Southwestern District:
William St. Gemme has served as an Environmental Sanitarian in the Southwestern District Health Office for 13 years. He is a graduate of the Westminster College in Fulton and obtained his M.S.P.H. from the University of Missouri-Columbia. Bill's hobbies include fishing and square dancing.

Northeastern District:
Robert Maley, a graduate of Northeast Missouri State University with a B.S. in Zoology, worked as an Environmental Sanitarian in the Northeastern District Health Office the past ten years. A dedicated fisherman, he'll readily tell you about the "one that got away."■

Sentinel Active Surveillance Report, Selected Diseases, 1988

Reportable Diseases	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTALS
Amebiasis	0	3	1	0	1	2	0	3	0	0	3	2	15
Animal Bites	70	63	158	143	155	288	185	176	194	144	133	65	1774
Campylobacter	12	10	2	13	10	21	26	28	16	12	24	15	189
Chickenpox	1000	1210	1942	1548	1466	496	95	73	95	117	604	860	9506
Giardia	8	5	15	11	15	25	18	26	20	24	24	15	206
Gonorrhea	104	133	137	117	99	131	103	180	125	114	148	154	1545
Hepatitis A	77	68	56	33	36	17	18	25	73	22	27	18	470
Hepatitis B	16	20	15	15	13	19	14	13	12	8	16	19	180
Hepatitis NA-NB	5	4	7	4	3	7	3	2	1	2	2	2	42
Influenza-like Illness	7578	12351	6710	2868	2077	555	324	429	1004	1565	2757	2529	40747
Legionellosis	0	0	0	2	3	1	1	4	2	1	0	0	14
Listeria monocytogenes	0	1	0	0	2	1	0	1	0	0	4	2	11
Measles	0	1	4	2	10	3	0	5	2	6	7	38	78
Meningitis, Aseptic	3	2	6	2	4	7	4	15	4	5	5	1	58
Meningitis, *H. influenzae*	5	5	6	5	6	1	3	3	5	3	12	7	61
Meningitis, Meningococcal	4	8	0	2	2	0	0	0	0	5	0	1	22
Mumps	7	14	18	14	11	9	3	4	7	16	6	10	119
Pediculosis	705	504	873	485	529	219	220	583	1402	1097	1932	823	9372
Pertussis	1	0	0	0	0	1	1	5	0	1	1	1	11
Rocky Mtn Spotted Fever	0	0	0	0	5	10	15	18	10	2	2	2	64
Rubella	2	1	0	1	1	1	1	1	0	0	2	1	11
Salmonella	15	13	9	14	18	19	20	34	27	18	15	63	265
Scabies	72	111	137	77	74	44	20	26	47	98	148	113	967
Shigella	6	8	11	6	9	18	20	17	11	5	12	10	133
Tetanus	0	0	0	0	0	1	0	0	0	0	0	0	1
Toxic Shock Syndrome	0	1	1	0	0	0	0	1	0	0	2	0	5
Tuberculosis	7	10	13	13	19	12	27	17	4	6	7	12	147
Tularemia	3	3	1	2	6	5	8	6	1	0	0	2	37
Typhoid Fever	1	0	0	0	0	0	0	2	1	0	0	2	6
Viral Rash	53	125	86	60	42	16	15	53	27	10	25	17	529
Yersinia enterocolitica	1	0	0	1	1	2	1	1	0	0	1	0	8
Other Diseases/Conditions													
Conjunctivitis	119	219	423	303	389	196	66	43	100	95	889	172	3014
Meningitis, Other	1	0	0	0	2	2	0	2	1	1	1	0	10
Roseola	20	10	12	6	11	0	7	4	1	5	3	6	85
Scarlet Fever	61	83	104	82	81	24	8	20	19	42	73	67	664
Strep Infections	1294	2245	2477	1323	1185	615	292	444	472	564	1089	1116	13116
Weather Related Illness	40	74	26	7	16	28	94	159	15	0	6	20	485

1988 Year End Review of Selected Communicable Diseases

Prevention and control of communicable diseases are achieved through surveillance, consultation services, epidemiologic field investigations and recommendations. The following two tables outline the outbreaks which were reported to the Bureau of Communicable Disease Control during 1988.

Nosocomial Outbreaks by Type, 1988

Scabies	7*	7 Nursing Home
Staph aureus	2*	2 Nursing Home
GI Illness	2	1 Nursing Home, 1 Adolescent Home
Other	1	1 Nursing Home

* One outbreak involved both scabies and *staph aureus*

Community Disease Outbreaks by Type 1988

Salmonella	5	4 Foodborne, 1 Day Care
Giardia	3	2 Day Care, 1 Other
Hepatitis A	3	3 Person to Person
Shigella sonnei	2	2 Day Care
Staph Intox.	2	2 Foodborne
Waterborne - Agent Unk	3	2 Drinking, 1 Swimming
Foodborne - Agent Unk	2	2 College
Other	1	1 Other

Salmonella

A total of 772 cases of salmonella were reported for an overall state rate of 15 per 100,000 population. This is a 17 percent increase over 1987. Southwestern District had the highest rate, 19 per 100,000. The lowest rate was reported in the Northeastern District, nine per 100,000. Five salmonella outbreaks were reported in 1988, as shown in Table 1. The most frequently reported serotypes are shown in Table 2.

Table 1
Salmonella Outbreaks
Missouri, 1988

Serotype	Cases	Location	Setting
Typhimurium	12	St. Louis Co.	Foodborne
Heidelberg	10	Boone	Day Care
Virchow	36	SW District	Foodborne
Manhattan	12	NW District	Susp. foodborne
Heidelberg	45	Buchanan	Foodborne

Table 2
Most Frequently Reported Salmonella Serotypes, Missouri, 1988

Serotypes	Cases	Percent
Typhimurium	220	28.5
Heidelberg	90	11.7
Enteritidis	60	7.8
Virchow	35	4.5
Hadar	33	4.3
Newport	21	2.7
Muenchen	19	2.5
Braenderup	19	2.5
Thompson	17	2.2
Agona	17	2.2
Manhattan	15	1.9
All Others	137	17.7
Unspecified	89	11.5
TOTAL	772	

Shigella

There were 607 cases reported cases of shigella for an overall rate of 12 per 100,000 population. This is a 29 percent increase over 1987. *S. sonnei* was the most commonly reported serotype (77 percent of those typed), followed by *S. flexneri* at 5 percent. Six cases of *S. dysenteriae* were reported, of which four were imported from Cancun, Mexico. Southwestern District had the highest reported rate, 25 per 100,000; the city of Springfield had a rate of 95 per 100,000. Central District had 120 cases (20 per 100,000). The lowest rate was reported in Northeastern District (one per 100,000). Three areas experienced daycare-related outbreaks of shigella in 1988, including Springfield (132 cases), Cole and Callaway counties (83 cases) and St. Charles County (43 cases). ■

Campylobacter

Increased reporting of campylobacter resulted in 441 reported cases in 1988 for an overall rate of 9 per 100,000 population, representing a 70 percent increase over 1987. Southwestern District had the highest rate (14 per 100,000) and Northeastern District the lowest (1.5 per 100,000). Much of the increase in reporting probably resulted from more widespread laboratory testing for campylobacter. Recent prevalence studies in other states have found campylobacter to be more common than salmonella.

Hepatitis A

Reported cases of hepatitis A continued to increase with 897 cases reported in 1988 for an overall rate of 18 per 100,000 population. This is a 60 percent increase over 1987, and represents the highest number of cases ever reported for Missouri. The highest rate was in the Northwestern District (59 per 100,000), with Independence (146 per 100,000) and Kansas City (81 per 100,000) most heavily affected. Eastern District had the lowest rate (2 per 100,000), and all other districts' rates declined compared with 1987.

Hepatitis B

639 cases were reported in 1988 for an overall rate of 13 per 100,000 population, a 39 percent increase over 1987. This is the highest number of hepatitis B cases ever reported. Northwestern District had the highest rate (19 per 100,000); Kansas City's rate was 36 per 100,000. Central District was next with 16 per 100,000; most of these cases were in Boone County (40 per 100,000).

Giardia

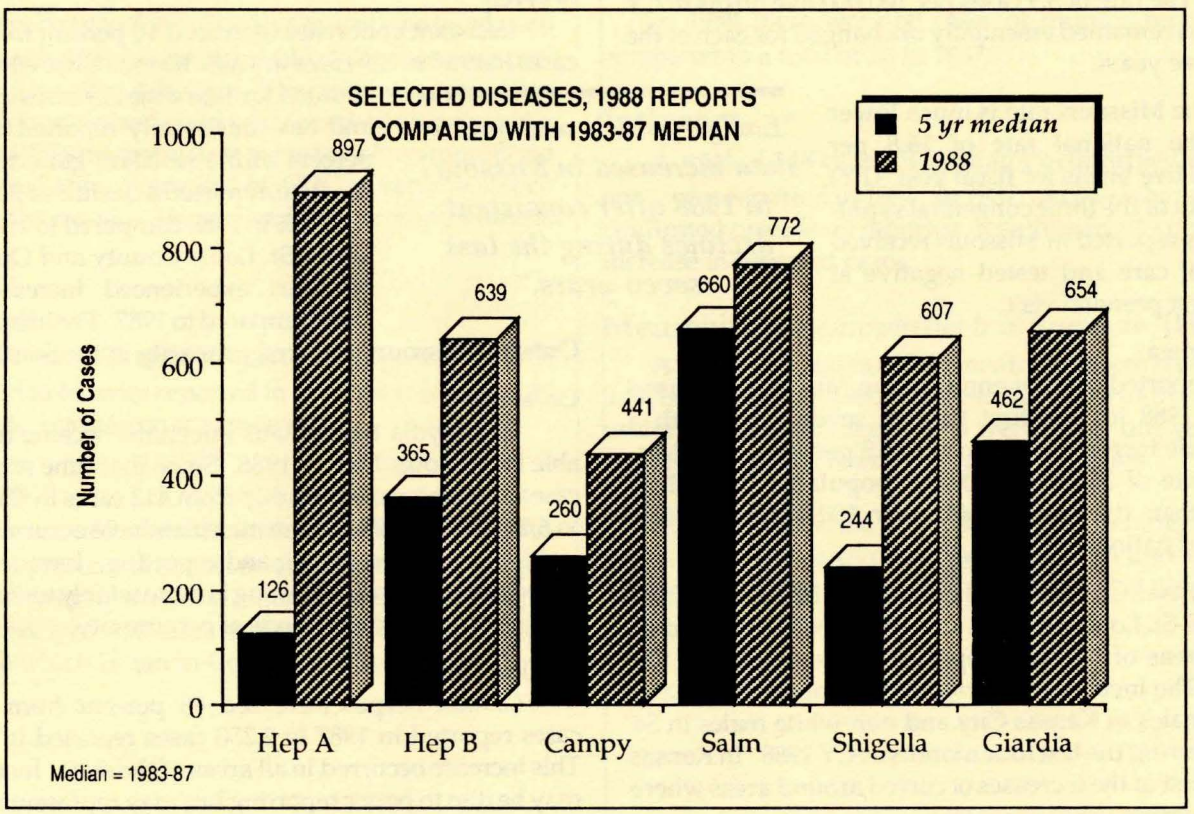
During 1988, there were 654 cases reported for an overall state rate of 13 per 100,000 population. This is a five percent decrease from 1987. Central District had the highest rate, 18 per 100,000 population. The lowest rate was reported in the Southeastern District, 8 per 100,000.

Yersinia enterocolitica

30 cases were reported for an overall state rate of 0.6 per 100,000 population. This is a 233 percent increase over 1987. Eastern District had the highest rate, 1.2 per 100,000 population. Southeastern District and Central District did not report any cases.

Influenza

142 influenza isolates were submitted in 1988, which represents a 97 percent increase over 1987. Subtypes reported were A/Sichuan (H3N2), A/Leningrad (H3N2), and B/Ann Arbor. These were the most common subtypes nationwide during the 1987-88 influenza season.



1988 Sexually Transmitted Diseases: Syphilis & Gonorrhea Increasing

Ray Bly, Chief, Bureau of Sexually Transmitted Diseases

Early Syphilis (Primary, Secondary and Early Latent Under One Year)

An increase in early syphilis was reported in Missouri for calendar year (CY) 1988. This is only the second year in which an increase has been recorded since 1981 when 579 cases were reported. Primary and secondary syphilis increased by 71 percent from 90 cases in 1987 to 154 cases reported in 1988. Early latent cases increased by 78 percent from 63 cases reported in 1987 to 112 cases reported in 1988. These increases occurred specifically in Kansas City and Southeast Missouri. The increases occurred among non-white males and females who are primarily heterosexual.

The majority of the Kansas City cases were clustered around crack-cocaine users where increases have also been noted in other sexually transmitted diseases.

The Missouri primary and secondary rate of 2.9 per 100,000 population is significantly lower than the 1990 national objective of seven cases per 100,000 population (1988 national rate was 16.4 per 100,000 population).

Congenital Syphilis

Reported cases of congenital syphilis have remained at a level of three cases per year for the last three years. The rate of 3.9 cases per 100,000 live births in CY 1988 has remained essentially unchanged for each of the last three years.

The Missouri rate is much lower than the national rate of 16.8 per 100,000 live births for fiscal year (FY) 1988. All of the three congenital syphilis cases reported in Missouri received prenatal care and tested negative at their first prenatal visit.

"Early syphilis and gonorrhea increased in Missouri in 1988 after consistent declines during the last seven years."

Gonorrhea

Reported cases of gonorrhea in Missouri increased in CY 1988 for the first time in seven years with a statewide increase of 750 cases (4.5 percent). The Missouri rate of 335.4 per 100,000 population is slightly lower than the rate of 346.8 per 100,000 population reported nationally for FY 1987.

Kansas City reported an increase of 1,177 cases in CY 1988, St. Louis reported an increase of 95 cases and all other areas of the state reported declines totaling 522 cases. The increases occurred among non-white males and females in Kansas City and non-white males in St. Louis during the last four months of CY 1988. In Kansas City, most of the increases occurred around areas where crack-cocaine use is prevalent.

Non Gonococcal Urethritis (NGU)

Reported cases of NGU decreased by 4.4 percent from 7,947 cases reported in CY 1987 to 7,606 cases reported in CY 1988. This decline was not surprising because of the increase in the diagnosis and treatment of chlamydia trachomatis infections and the application of dual therapy regimens (one medication adequate to cure gonorrhea plus a second medication adequate to cure chlamydia) being utilized to treat gonorrhea in STD clinics and also in some areas of the private medical community.

Gonococcal Pelvic Inflammatory Disease (GPID)

GPID increased by 8.6 percent from 696 cases reported in CY 1987 to 756 cases reported in CY 1988. This is the first year an increase has occurred since Missouri began tabulating GPID in 1982. These increases occurred in St. Louis, St. Louis County and Kansas City with a decline of 52 cases reported in Outstate Missouri.

The Missouri rate of 27.7 cases per 100,000 females is significantly lower than the national 1990 objective of 60 cases per 100,000 population.

Penicillinase Producing Neisseria gonorrhoeae (PPNG)

Resistant gonorrhea increased 10 percent from 208 cases in 1987 to 229 cases in 1988. Kansas City, which accounted for 160 of the 229 cases in 1988, and has consistently reported a high percent of the resistant gonorrhea in the state, reported a decline of 22 cases or 13.7% in 1988 compared to 1987. St. Louis, St. Louis County and Outstate Missouri experienced increases in 1988 compared to 1987. The increase in Outstate Missouri occurred primarily in the Southeast.

Chlamydia

Chlamydia trachomatis infections became reportable in Missouri March, 1986. Since that time reported cases have increased steadily from 412 cases in CY 1985 to 6,239 in CY 1988. These increases have occurred as a result of increased testing and reporting. Increases are expected to continue as testing is more widely utilized by the public and private medical community.

Genital Herpes

Genital herpes increased 68 percent from 1,340 cases reported in 1987 to 2,250 cases reported in 1988. This increase occurred in all areas of the state. Increases may be due to better reporting but may represent actual increases in disease or possibly both. ■

Tuberculosis 1988: Concern Rises for Inmate Populations and AIDS Cases

Bert Malone, Chief, Bureau of Tuberculosis Control

In 1988, there were 275 cases of tuberculosis reported in Missouri for a case rate of 5.4 per 100,000 population. This represents a reduction of 64 cases from the previous year and a sharp contrast to the alarming trend of increased incidence in the two previous years.

The areas of decreased tuberculosis incidence are the metropolitan areas of St. Louis City, St. Louis County and Kansas City with a combined decrease of 36.7 percent over 1987. Tuberculosis increased by two cases in the outstate area of the state.

Of significant concern during 1988 was the increase of tuberculosis among inmates of state and federal correctional centers. During 1988, a total of 14 inmates were reported with TB.

Also of concern is the association between AIDS and tuberculosis. In Missouri, the AIDS case register has been compared to the tuberculosis case register in order to determine the proportion of tuberculosis patients with AIDS and certain characteristics of individuals with both conditions. This linking of the two registries has taken place on a monthly basis since late 1985. Of the 820 cases of AIDS reported through 1988, 17 individuals also had a diagnosis of tuberculosis. In addition, there have been 29 cases of mycobacterial disease other than tuberculosis reported among AIDS patients. ■

Vaccine Preventable Diseases

Ken Laliberte, Chief, Bureau of Immunizations

Polio

One polio (vaccine-related) case was identified in an unimmunized four-year-old, male child attending preschool in Hannibal, Missouri. The child was exposed to a recently immunized child who was shedding the polio virus. In 1987, one case was reported in a four-month-old child in St. Louis, diagnosed by CDC as vaccine-associated paralytic polio. He received the vaccine on June 5, 1987.

Pertussis

There were 25 cases of pertussis reported in 1988 compared to 46 cases reported in 1987, representing a 46 percent decrease from the prior year.

Measles

There were 65 cases of measles reported in 1988; this number represents the onset of an outbreak which began in the Kansas City area and extended into the Spring of 1989. There were 190 cases reported in 1987 including an outbreak which began in Columbia, Missouri.

Mumps

In 1988 there were 68 cases of mumps reported, compared to a total of 38 in 1987.

Influenza

A total of 148 cases of laboratory-confirmed influenza were reported in 1988. In 1987, only 69 laboratory-confirmed cases were reported, resulting in a 49 percent increase in reported cases.

Meningitis *Haemophilus b influenzae* (Hib)

A total of 140 cases of Hib meningitis were reported in Missouri during 1988. Of these, 135 were individuals under four years of age and 75 were under one year of age. Seven deaths resulted from the 140 cases.

In 1987 there were 131 cases of Hib meningitis reported, with 106 cases occurring in children under four years of age. Three deaths resulted from the 131 cases. ■

1988 AIDS Activities

Ted Northup, Chief, Bureau of AIDS Prevention

In FY 89, the AIDS epidemic continued to expand as the Bureau of AIDS Prevention's (BAP) response continued to strengthen. The year saw the development and implementation of a significant new program to assist Missourians challenged with HIV. The HIV Care Coordination Program is the "bridge" between traditional public health initiatives and the provision of actual care. This linkage with the provider community is essential to fighting the continued spread of HIV.

As a complement to other programs developed and fielded by the Bureau, an agreement with the Bureau of Sexually Transmitted Diseases has allowed STD's Disease Intervention Specialists to provide confidential notification of exposure to sex and needle sharing partners of persons diagnosed with HIV infection. This joint effort has yielded significant results and will continue to be expanded.

Also in FY 89, the General Assembly removed and the Governor signed the December 31, 1989 sunset provision in the comprehensive AIDS legislation passed in 1988. The removal of this provision allows the BAP to move forward with the implementation of the major provisions of the law with confidence in its durability. This major piece of legislation has been referred to as a model for other states and the nation. This is notable because it incorporates the concepts of the DOH's Eight Point Plan to combat AIDS that have been the guiding principles for the BAP since June 1987.

Funding for BAP initiatives increased this fiscal year to over five million dollars. The funds contracted to local health departments, community based organizations and other agencies increased proportionately. BAP now has over two million dollars contracted with these agencies plus in kind services such as laboratory support. The Bureau negotiated a contract with the University of Illinois to receive Health Resources and Services Administration (HRSA) funding for education of medical and health care professionals. This contract makes the BAP a member of the Midwest AIDS Training and Education Center and links Missouri with five other states. Through this educational effort a missing link in the care for persons with HIV illnesses will be addressed. ■

Missouri EPIDEMIOLOGIST

Published by the
Missouri Department of Health
Division of Environmental Health
and Epidemiology Services
P.O. Box 570, 1730 E. Elm Street
Jefferson City, MO 65102-0570
Telephone: (314) 751-6080
Toll-free No.: 800-392-0272

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